DOCUMENT RESUME

ED 258 919 SO 016 683

AUTHOR Koroscik, Judith S., Ed.; Barrett, Terry, Ed.
TITLE Arts and Learning SIG Proceedings: American Educational Research Association Annual Meeting (New Orleans, Louisiana, April 23-27, 1984). Volume 2.
INSTITUTION American Educational Research Association, Washington, D.C.
PUB DATE 84
NOTE 124p.; For Volume 1, see SO 016 682. Document contains small print throughout.
PUB TYPE Collected Works - Conference Proceedings (021)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Art Activities; *Art Education; *Childrens Art; *Creative Expression; Drama; *Educational Research; Elementary Education; Evaluation Methods; Films; Freehand Drawing; Museums; Music; Nonprint Media; Photographs; Primary Education; Visual Arts; Young Children
IDENTIFIERS Art Criticism

ABSTRACT

Sixteen conference papers representing diverse topics concerning research in the arts and presented as part of the 1984 Arts and Learning Special Interest Group (SIG) program of the American Educational Research Association are presented in the second of two volumes. Papers presented include: "First Graders' Conversations about Art Making: Social Life, Fantasy, Play, Verisimilitude, and Procedures" (Robin Alexander); "Film and Interest: An Analysis of Elementary School Children's Preferences for the Liveliest Art" (Carole Cox); "Children's Representations of Time in Music" (Carolyn Hildebrandt); "The Effects of Verbal Contextual Information on Visual Art Processing" (Judith Koroscik); "What is Said and What is Depicted: The Role of Medium, Referent, Age, and Knowledge in Representation: (Stuart Reifel); "Photographs, Contexts, and Interpretations" (Terry Barrett); "Developing an Instrument to Measure Dramatic Behavior" (Helane Rosenberg, Patricia Pinciotti, and Jeffrey K. Smith); "Differences among Ability Groups in the Performing Arts at the High School Level" (Patricia Dwinell and Mark Hogrebe); "The Application of Questioning Strategy Research to Art Criticism Instruction" (Karen Hamblen); "The Research and Development Function of the 1983 Getty Institute for Educators on the Visual Arts" (Jean C. Rush, W. Dwaine Greer, and Hermine Feinstein); "The Philadelphia Museum of Art Institute as Research and Development" (Theodore Katz); "The Philadelphia Museum of Art as a Vehicle for Inservice Education" (Jesse Lovano-Kerr); "A Study of Infant Musical Productivity" (Linda Kelley and Brian Sutton-Smith), "Contextual Information Effects on the Categorization of Differences among Photographs" (Kathleen Desmond and Judith Koroscik); "Perspective Drawing as Problem Solving" (J. Anne Murphy); and "Strategies of Representation: Observational Drawings of Four- and Five-Year Old Children" (Cynthia Colbert). The conference program is appended. (LH)

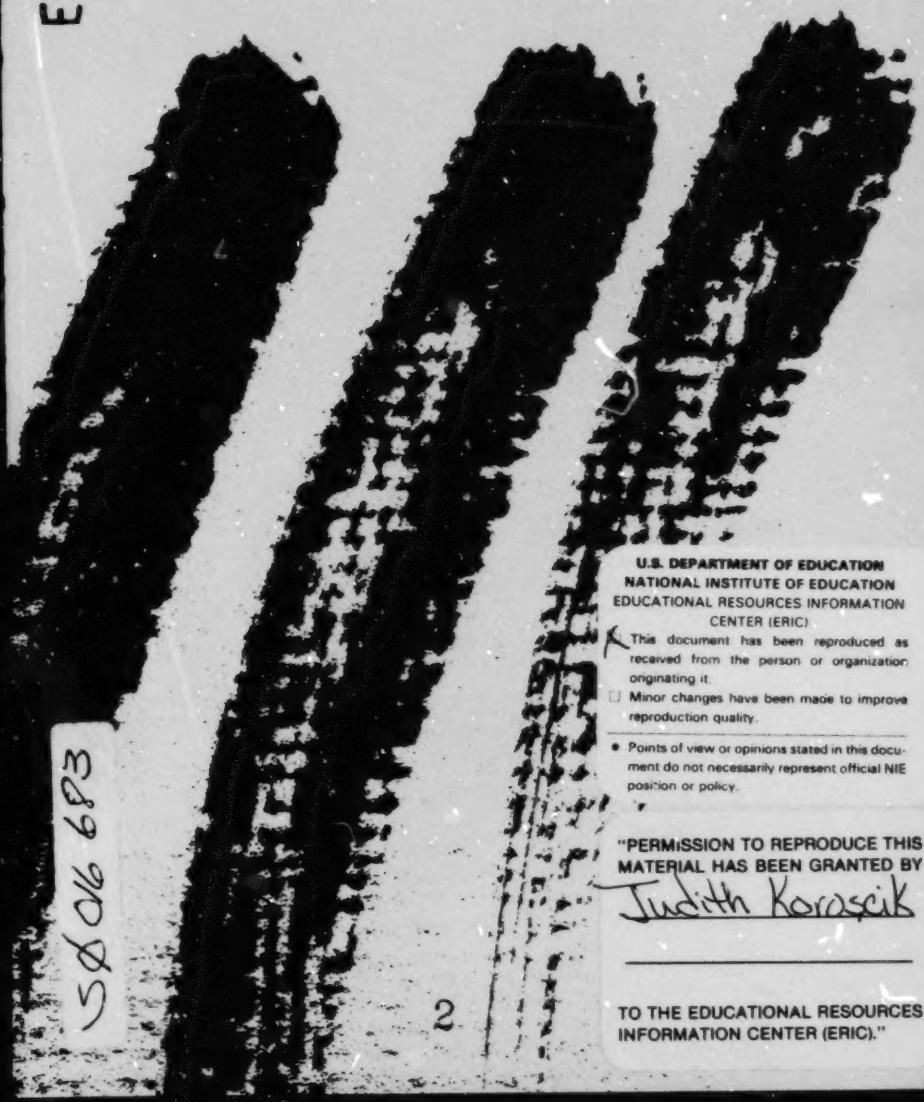
ED258919

American Educational Research Association

Arts and Learning SIG

PROCEEDINGS

1984 Annual Meeting—New Orleans



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Preface

The research reported in this volume was presented at the 1984 annual meeting of the American Educational Research Association as part of the Arts and Learning Special Interest Group program. Papers were selected for the program in a blind review process by Hermine Feinstein, Program Chair, and the Program Committee whose members included: Cynthia Colbert, Judith Koroscik, Stuart Reifel, Nancy Smith, and Martha Taunton. This publication reflects their efforts and the support of several others to whom we are grateful.

We thank Kenneth Marantz, Department of Art Education at The Ohio State University, for providing a loan to cover production costs. We thank the College of the Arts Information and Publication Office, also at The Ohio State University, for our cover design by Thomas Webster. We thank the Arts and Learning SIG officers for their leadership during 1983-84. Lastly, we thank the conference participants for their outstanding contributions to the 1984 meeting in New Orleans.

Judith S. Koroscik and Terry Barrett, The Ohio State University
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Arts and Learning SIG American Educational Research Association

Proceedings Journal Volume 2, 1984

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First Graders Classroom Conversations About Art Making: Social Life, Fantasy and Play, Verisimilitude, And Media/Procedures

Robin R. Alexander
Eanes School (TX)

In teaching art to first graders daily, I was intrigued by children's conversations about drawing on "free days" and about painting during more structured self-portrait painting sessions. I decided to document and categorize the differences in the content of conversations that children had during the two types of experiences--unstructured and structured. In this paper I intend to compare the differences between the content of the "free drawing days" and structured painting situation conversations and develop a description of the types of conversation children have during art classes.

I employed ethnographic techniques in this study but do not, at this point, intend to develop a complete ethnography from this data and analysis. I observed in the setting, interviewed informants, analyzed children's drawings and paintings, audio-recorded classroom conversations, and informally counted conversations of certain types in the classroom. Due to the nature of children's simultaneous multiple conversations in the classroom, no exact count of the types of conversations could be made. However, some deductions can be made about the types of conversations using evidence from the tape recordings and notes taken during drawing and painting sessions.

I define "free days" as the interstices when just a few stragglers are finishing a project, when the ceramics company has not yet delivered the promised clay, or when I am in the "clean the room transition" between clay and weaving. The product of a "free day" is a "free drawing." Children have their choice of media: crayons or markers on white or colored construction paper.

The structured self-portrait entailed: (a) talking about six reproductions of painted portraits by Renoir, Turner, and Gainsborough; and self-portraits by Van Gogh, Rousseau, and Durer; (b) making a pencil sketch self-portrait; (c) making a drawing on heavier weight painting paper either by tracing or copying; and (d) painting the self-portrait and the background. The reproductions of portraits and self-portraits stayed up on the bulletin board during the entire unit on painting. The children knew the names of the artists and could talk about each very different portrait or self-portrait. Children had already spent one day exploring making secondary colors and lightening and darkening colors with white and black, and a second day making a "free painting." A poster showing how to mix secondary colors and popular tints was also on the bulletin board during the assignments. This assignment entailed about three and a half hours of classroom time spread over seven half hour periods.

Last year I took slides of various "free drawings" the youngsters did when no constraints were made on the subject matter. I also

observed and recorded the remarks that youngsters made in conjunction with this art making. Last year I documented children's intrinsic interests such as fantasy, mass media characters, comic book characters, and developed a rationale for their appearance in the free drawing form (Alexander, 1983). The conversations recorded at that time provided the initial foray or baseline into the world of children's conversations during art class. This year more conversations were unobtrusively recorded in my classroom. I also interviewed a small sample of children to find out more about their conversation patterns. I then recorded remarks and lengthy conversations of children made during the structured portrait painting sessions. The six classes of first graders involved in the study are from the middle and upper middle class suburb in a Texas cosmopolitan community.

Children's talk about works of art has been recorded and analyzed (Lanier, 1968; Gartner, 1974). One study of early childhood art also included sections of dialogue of one child talking about a painting (Brittain, 1979). Studies of children's spontaneous conversations that occur in the course of art making in primary classrooms have not been made. In concentrating attention on the product of the drawing or painting session, art educators have neglected the conversations that children have about what they are making or doing and how they are going about it. Children's classroom conversations reveal information that teachers need to know to personalize the classroom experience and to present art history and art studio experiences in a more meaningful way. Although much of the information is extraneous, some is very helpful.

Four basic kinds of conversations emerged from the recordings and from the notetaking sessions: (a) social; (b) fantasy and play; (c) the art media or procedures; and (d) issues of verisimilitude. Social conversations involved content centered on the social life of small children--the soccer team, birthday parties, tap dance lessons, and who got sent to the office for fighting during lunch. Fantasy and play conversations mostly involved children imagining they were involved in a giant Pac Man game or that they were Hans Solo in Star Wars. These conversations sometimes involved parallel remarks as in "parallel play," or sometimes involved two or more participants talking directly to one another. Conversations about media and procedures involved issues of color mixing ("How do you make green?"), marveling at the color changes in the water for cleaning brushes ("Oooh! The water turned purple." or "I made chocolate milk."), or the thickness of the tempera paint ("This sure is gushy."), or information requests about procedures ("When do we start on our good one?"). Discussions of verisimilitude or likeness fell into two subcategories: (a) the negative, such as "My arm is too short." "The shoulders should be wider." "Your arms are coming out of your head;" and (b) positive compliments on the successful achievement of verisimilitude, such as "You really painted that mouth good." Other topics occurred as well, but these four categories occupied roughly, in my estimate, 95% of the classroom conversation.

Social Conversations

Social talk happened during all kinds of assignments during the school year and especially during free drawing time. Social talk makes up the bulk of the first grade chatter during the school year. Social conversation is severely limited by homeroom teachers in the first grade as youngsters spend most of their time in reading and arithmetic instruction. Lunch time allows only limited outlets for talking as the conversation level must be kept low and children are not allowed to move freely around the lunch room. Youngsters' natural conversations patterns are suppressed during "lineup" and during the walk from one class to another so as to not disturb other classes. During physical education there are not many opportunities for conversation. During music, the youngsters spend most of their time singing or playing instruments. Recess and art are the only opportunities left during the school day for talking about social affairs. Children are interested in what other children are doing for birthdays, after school, in who has new brothers and sisters, in who is moving, in who is staying, in who has gotten into trouble. All of these subjects have nothing to do with art education. In talking with other art teachers, I found that this is the kind of chatter that gets on adults' nerves; given their druthers, art teachers would suppress this classroom talk. Unfortunately, there is no way to exclude this type of talk and allow the other three types of talk which are more fruitful for the child and the teacher.

Fantasy and Play Conversations

Ordinarily, children are not encouraged to play or fantasize during the school day except during creative writing. Singer (1977, 1981-82) stresses the healthy aspects of fantasy in educational settings. Alexander (1982) has also examined fantasy in artmaking situations to see how fantasy fits with notions of art education. Since youngsters have little opportunity to fantacize, the chance to manipulate and control figures from mass media events and play acting while drawing seems to have some educational merit. Considerably more fantasy and play conversation occurred during the free drawing sessions than during the structured self-portrait painting sessions. The lower constraint level of free drawings seems to encourage more fantacizing and more playful imagery. Although children impose their own constraints during free drawings, they pick subjects that are possible and do small extensions on the known. Fantasy can also spill over into the area of media as unplanned color mixing or even a change in the color of the paint water can sometimes prompt children into a fantasy world.

Media and Procedures Conversations

The media and procedures conversations occurred far more during painting sessions than during the free drawing sessions. After spending time mixing colors on a "color experiment day," children often forgot how to mix colors. In past years, I tried providing children with many colors in their egg cartons; then almost all of the colors children used in their paintings were drawn straight from the egg

carton and little mixing occurred. Then I tried having students spend a day doing guided experimentation and related the colors to the self-portrait reproductions on the wall. Children often mixed colors when presented with a palette of white, black, yellow, turquoise, magenta, and brown. For instance, many children asked "How do you make blonde [hair]?" In my community with a high concentration of German heritage, that is a good question. It is also a question that poses a quandry for the researcher. Is blonde a problem of media or a problem of verisimilitude? I believe it is both

Verisimilitude and Likeness Conversations

Issues of verisimilitude and likeness were far more numerous during the portrait painting sessions than during free drawing sessions. Children wanted to make self-portraits that had a ring of truth to them, that resembled them. The hair needed to be the right color; the details on the "Care Bear" t-shirt needed to coincide with "reality," and youngsters often wore the same t-shirt several times so they could get the design "correct." These pushes toward a realistic painting style were not encouraged during the classroom introduction to self-portraits. Instead, the push toward verisimilitude seemed to be prompted by an internal agenda. Children usually undergo a crisis about issues of verisimilitude at about the fourth grade level; many drop out of solitary, unsolicited drawing experiences at the age of nine or ten. This study shows that many youngsters encounter issues of likeness and verisimilitude at an earlier age and become anxious about them as early as the first grade. Verisimilitude was not emphasized in the discussions of the self-portraits by famous artists, not was it emphasized during the drawing or painting task. Yet this emerged as an important issue for first graders at the age of six and seven.

Some of each type of conversations were found during each type of sessions. Children all like to socialize and will seize every opportunity to do so. It would seem that the art instruction in color and in self-portrait encouraged conversations about the media itself and verisimilitude, while free drawing encouraged children to be more playful and to fantacize.

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Film and Interest: An Analysis of Elementary School Childrens' Preferences for the Liveliest Art.

Carole Cox
Louisiana State University

A review of the literature on print and non-print media theory and research reveals hundreds of studies on reading interests (Purves & Beach, 1973) and indeed comparisons of reading interests of similar populations over time (Van Nord, 1980). Researchers have also investigated children's television tastes over the years (Atkin, 1971; Hartshorn, 1983; Witty, 1967), as well as preferences of secondary students and teachers for photography, television, and film (Stimpfle, 1974), television and film (Beach, 1977), and film (Austin, 1979, 1982).

Other studies have attempted to cut across media and search for an underlying pattern of children's interests in all media forms (Himmelweit, 1958) while Schramm, Lyle, and Parker (1961) have asserted that children choose reality themes in print because they turn to print for informational needs but prefer fantasy themes on television because they look to television for their entertainment needs.

Feeley (1972, 1979) investigated the interrelationship of content interests and media choice through the use of an annotated questionnaire of fictional titles which might be found in print or on television. Her findings support Himmelweit's hypothesis that children have an underlying pattern of media interests since their reading interest patterns conformed closely to their media preference patterns. She also found that children have a preference for viewing in all areas, indicating that today's child prefers watching over reading.

There is a paucity of research, however, which identifies or describes elementary school children's preferences for the liveliest art, film, based on actual viewing experiences even through empirical information on interests is critical to the effective use of any medium in teaching, print or non-print.

Purpose of the Study

This study sought to identify and describe the interest patterns of fourth and fifth grade children as they pertain to the content, form, and technique of the short art film based on preferences expressed by the children themselves after actually viewing firms, to compare the interest patterns of children according to sex, race, and socioeconomic status, and to compare boys' and girls' interest patterns with teachers' judgments of boys' and girls' interest patterns.

The films used in this study were original entertainment films, eighteen minutes or less in length, created by film artists, apparently interested in using the film medium as a means of artistic self-expression. They are the type of films used by screen educators to help children experience, enjoy, and extend the art of the film, and are not

to be confused with the instructional film used specifically to teach subject matter, or the iconographic film made from book illustrations which is used as an aid to the teaching of children's literature.

Method

Twenty-four short art films were rated by 218 children in twelve fourth and fifth grade self-contained classrooms in two elementary schools in Baton Rouge, Louisiana, one all Black Chapter I school and one all White non-Chapter I school. Children were categorized by the single term race/SES, rather than separately for race and socioeconomic status, since all the children who attend one are Black and designated Chapter I, and all the children who attend the other are White and are not designated Chapter I.

After viewing each film, the child was asked to circle one of the five sentences under the name of the film on a questionnaire developed for the study to indicate a rating of the film.

Questionnaire

Name _____ Boy ____ Girl ____ Grade ____ School _____

How much did you like this film?

Film (name of film)

I didn't l[illegible] it at all.	(I would rather have done something else.)
I didn't [illegible] it very much.	(I wouldn't want to see it again.)
It was o.[illegible]	(I wouldn't mind seeing it again.)
It was good.	(I would like to see it again.)
It was great!	(I would see it many times without getting tired of it.)

Four films were rated in this way each week on each questionnaire; twenty-four films were rated in this way over a six-week period. The ratings of each film were weighted as follows (1 = I didn't like it at all; 2 = I didn't like it very much; 3 = It was o.k.; 4 = It was good; and 5 = It was great!). On a second page of the questionnaire, the child was asked to rank the four films in order of preference. These rank-orderings were used to determine whether or not children have a preference for certain film forms and techniques.

Each film used in the study fits one of four categories of film form and film technique in combination: narrative/live-action; narrative/animation; non-narrative/live-action; non-narrative/animation. One of each of the four types of films was shown each week so that a rank-order of the films might reveal a consistent preference of children for some types of film form/technique. The four types of films were shown in random order each week. The same questionnaire form that was used by children was also used by the participating teachers. Teachers ranked the films according to how they thought boys would rank them and how they thought girls would rank them.

Children's mean film ratings were subjected to factor analytic procedures to determine areas of interests. The average of the film means in each resulting factor was calculated and the final factors rank-ordered to determine the film preference pattern of all the children. Mean scores for each factor were computed in order to rank-order the interest factors for the sub-groups: boys and girls, children in School I (White, non-Chapter I) and School 2 (Black, Chapter I), boys and girls in School I and boys and girls in School 2. In addition, two-way analysis of variance was performed to determine whether or not the main effects of sex, or race/SES, or the sex by school interaction significantly affected the degree-of-interest of the subgroups in any interest factor.

The Freidman two-way analysis of variance by ranks was used to determine whether or not the children in this study showed a significant preference for any of the film form/techniques. Average film scores were computed for each interest factor based on the mean film ratings according to how teachers thought boys and girls would rate films. It was decided to ask teachers to rate boys and girls separately since most reading and media research has shown that middle-grade boys' interests differ from those of middle-grade girls.

Mean scores for factors were then rank-ordered to provide a pattern of boys' and girls' interests based on teachers' predictions of their interests. The Freidman two-way analysis of variance by ranks was performed for teachers' judgments of boys' and girls' rank-orderings of films according to the four types of film form/technique. The level of significance for all tests was set at .05.

Results

Children's ratings of the twenty-four films used in the study grouped into eight interest factors listed here in order of preference by all children: Real Children/Work and Play, Children and People/Suspense, Fantasy/Excitement, Action-Sport/Outdoors, Fantasy/Humor, Nature, and Abstract Visual. Items in this analysis consisted of the twenty-four short films.

Sex was not closely associated with these fourth and fifth grade children's film interests. Neither the rank-orderings of the film factors, which showed the relative interest of children in a factor, nor the results of analysis of variance computed for mean ratings associated with each factor, which compared the degree-of-interest in any one factor, revealed major differences between boys' and girls' film preferences.

Race/SES is moderately associated with the degree-of-interest expressed by children for films. Black, Chapter I children rate films with fantasy and excitement, action and sports, and children higher than White, non-Chapter I children who rate films with animals and humor higher. But race/SES do not appear to be related to children's rank-order preferences of film factors, or to the relative popularity of films. No significant interactions between sex and race/SES were found

Table 1
Mean Scores for Factors with Films in Rank-Order for All Children

Rank	Interest Factor	Average of Film Means	Standard Deviation
1	Real Children/Work and Play The Blue Dashiki, The Fur Coat Club	4.57	.64
2	Children and People/Suspense The Case of the Elevator Duck, Clown, Rock in the Road	4.39	.57
3	Fantasy/Excitement Hansel and Gretel, Little Tom Thumb, The Little Airplane that Grew, Rock in the Road	4.01	.70
4	Action-Sport/Outdoors Catch the Joy, Karate, T is for Tumblewood	3.90	.82
5	Fantasy/Humor Anansi the Spider, The Daisy, Dance Squared, Le Merle, Rock in the Road	3.49	.71
6	Animals/Humor The Cow, Fiddle Dee Dee, Horses	3.04	.79
7	Nature Rainshower, Sky	2.58	.95
8	Abstract Visual Binary Bit Patterns, Cosmic Zoom, Sky	2.09	.78

Film rating scale: 1-I didn't like it at all; 2-I didn't like it very much; 3-It was o.k.; 4-It was good; 5-It was great!

for children's degree-of-interest in film factors. A summary list of these results is shown in Table 2.

Children showed a significant preference for certain film form/techniques. They liked narrative/live-action films best, narrative/animated and non-narrative/live-action next, and non-narrative/animated films least. Table 3 shows the mean rankings for each form/technique by children which may be interpreted in terms of the ranking scale on the questionnaire used by the children each week.

Table 2
Mean Scores for Factors and Results of Two-way Analysis of Variance

		Sex			
	Factor	Boys N=100	Girls N=100	F-ratio	p-value
1	Fantasy/Excitement	4.02	4.01	.23	.63
2	Fantasy/Humor	3.55	3.44	1.54	.22
3	Abstract Visual	2.15	2.05	1.05	.31
4	Action-Sport/Outdoors	4.34	3.52	82.83	.01*
5	Animals/Humor	3.13	2.96	2.18	.14
6	Real Children/Work and Play	4.57	4.58	.00	.97
7	Children and People/Suspense	4.38	4.40	.01	.92
8	Nature	2.76	2.44	6.14	.01*
		School			
		1[a] N=113	2[b] N=105		
1	Fantasy/Excitement	3.67	4.38	73.32	.01*
2	Fantasy/Humor	3.47	3.50	.11	.74
3	Abstract Visual	2.01	2.18	2.54	.11
4	Action-Sport/Outdoors	3.71	4.10	17.59	.01*
5	Animals/Humor	3.27	2.78	23.36	.01*
6	Real Children/Work and Play	4.35	4.81	31.10	.01*
7	Children and People/Suspense	4.30	4.48	5.19	.02*
8	Nature	2.56	2.61	.14	.71

*Level of significant: p = .05
[a]School 1: White, Non-Chapter I
[b]School 2: Black, Chapter I

Table 3
Mean Rankings of Film Form/Technique by Children

Subjects	Film Form/Techniques Mean Rankings[a] Narrative/ Live-Action	Narrative/ Animation	Non-Narrative Live-Action	Non-Narrative Animation
All Children	1.30	2.08	2.76	3.86
Boys	1.30	2.26	2.49	3.96
Girls	1.29	1.94	2.99	3.77
Boys, School 1: White, Non-Chapter I	1.38	2.25	2.44	3.94
Boys, School 2: Black, Chapter I	1.21	2.26	2.55	3.98
Girls, School 1: White, Non-Chapter I	1.41	2.03	2.74	3.83
Girls, School 2: Black, Chapter I	1.18	1.86	3.25	3.71

[a]Films were ranked on a scale of 1 (high) to 4 (low).

The judgment of boys' and girls' preference for both film interest factors and film form/technique by classroom teachers and Chapter I helping teachers were basically in agreement with children's expressed preferences.

Conclusions

The findings of this study provide criteria, based on empirical information, for selecting films for children. More specifically, if individuals concerned with the development of film programs in schools, libraries, and museums are interested in showing children in the middle-grades films they like, then narrative, live-action films with children as main characters appear to be a wise first-choice. All children in the sample, regardless of sex, race, or SES gave each narrative, live-action film which featured a child in a realistic setting a mean rating of at least "It was good." Some groups, such as Black, Chapter I children, gave this type of film a rating closer to "It was great!"

One should be aware, however, of the differences in degree-of-interest of some children in certain types of films. While all children liked films with children in realistic settings best, Black, Chapter I children rated them significantly higher than White, non-Chapter I children. They also rated films with fantasy, excitement, sports, action, and the outdoors higher. Rather than suggesting that Black, low-SES children liked these varied contents better because of their subject matter, since they are so varied, it may be that they are more enthusiastic about the film form in general. Perhaps short films should be more fully exploited in the education of lower-SES children.

One finding that may be of particular interest to screen educators is that children do not like animated films best. It is often assumed that if a film were animated, children would like it. A film program of limited means might better appeal to children by buying or renting films with live actors like Learning Corporation of America's Clown, The Case of the Elevator Duck, and The Fur Coat Club, and Encyclopedia Brittanica's The Blue Dashiki, than animated cartoon-like films.

Similarly, films with animal and nature subjects were given only moderate to low ratings by these children. And very abstract films like Binary Bit Patterns, Cosmic Zoom, Fiddle Dee Dee, and Growing were simply "not liked very much" by children. This may suggest a special need in film study programs to educate children's tastes with regard to more experimental, abstract films such as these.

In light of the current media explosion and awakening interest in the study of film as an art form in the elementary school classroom, in libraries or museums, not to mention a more complete integration of the art of the film into other areas of the curriculum, it is hoped that this study will provide educators with some needed empirical information on the parameters of middle-grade children's interests in the short film which may in turn lead to a deeper understanding and appreciation of the potential of film art in education.

And just as children are encouraged to experience the best in literature, art, and music, so they should be helped to experience the finest that the film form has to offer, for all these art forms will facilitate their emotional and intellectual growth, give them pleasure, and may stimulate their own creative work.

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Children's Representations of Time in Music

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Formal analyses of the rhythmic structure of music (Cooper & Meyer, 1960) suggest that certain temporal elements and relations are necessary for a complete representation of rhythm. These are symbols for sounds, correspondences between sounds and symbols, serial order of events in time, accent, grouping, and duration. Given the hierarchical nature of musical rhythm and the problems that children of different ages normally encounter with tasks which require complex temporal reasoning (Piaget, 1969, 1971; Fraisse, 1963; Friedman, 1982), one would expect interesting developmental trends to occur in children's representations of simple rhythms. Indeed, there is a growing body of evidence which suggests that children of different ages represent rhythm in qualitatively different ways (Birch & Belmont, 1965; Blank, Weider, & Bridger, 1968, Brearly, 1970; Goodnow, 1970, 1972, 1977; Bamberger, 1975, 1980, 1981; Hildebrandt & Richards, 1978; Buder, 1980). The present paper is a preliminary report on some results from a study that is currently underway at the University of California, Berkeley.

By the age of 4-5, most children can clap simple rhythm patterns with accuracy and ease. But the problem of how to make visible marks represent invisible sounds is a difficult one. When children of this age are asked to imitate a rhythm and then to "put something down on paper so that you could remember it next week, or so that someone else could play it just like you did," many draw pictures of the instruments they have just used to perform the pattern. For example, one little girl used a mallet to tap out a rhythm on the table. When asked to make a picture of the rhythm, she placed the mallet on the paper, traced its outline, and then colored in the ball at the end. When asked to make a picture of the sound that the mallet makes when it taps out the rhythm, at first she looked confused. However, after thinking for a moment, she said that she would draw a table if only it weren't so hard to do. Other children around the same age drew pictures of themselves clapping or made tracings of their own hands. All of these are examples of drawings that focus on the visible aspects of the rhythm, the instruments to be used and the actions to be performed on them, rather than the invisible aspects of the rhythm, the series of sounds that the objects and actions make. But for all their limitations, these drawings are musically expressive in that they provide an indication of the timbre that will be produced when the pattern is performed.

The use of written symbols to represent sounds emerges somewhere around the age of 5 or 6. However, at this age the sounds and symbols are not always in full correspondence with each other. A 1-1 correspondence between sound and symbol can first be seen in rhythms that consist of a small number of events. Around the same time that sound/symbol correspondences are constructed, another problem of written representation is solved, that of the serial order of each event in time. In the drawing in Figure 1, there is a 1-1 correspondence

between sound and symbol as well as a system for representing time as a linear continuum that reads from left to right. In this drawing, there are three girls because the rhythm has three claps.

Figure 1. A six-year-old child's drawing of the rhythm ♩♩♩

Around the age of 7 or 8, children begin to include other aspects of rhythm in their drawings such as accent, grouping, and duration. Figure 2 shows a developmental typology of children's representations of the rhythm that underlies the words "three, four, shut the door; five, six, pick up sticks."

Level 0: Iconic

Level 1: Prefigural

Level 2: Figural

Level 3: Formal

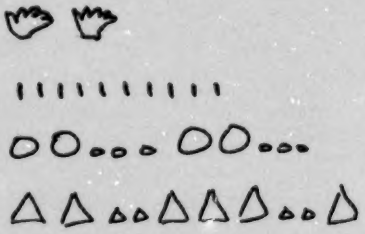

Figure 2. Examples of children's drawings of the rhythm ♩♩♬♩♩♩♬♩

The last two drawings in the typology have been studied in detail by Bamberger (1975, 1980, 1981). Figural drawings are produced mainly by people who do not know how to read music, or by those who knew how to read it at one time, but who no longer use it. Formal drawings are produced primarily be people who read music regularly from a score. When shown examples of figural and formal drawings of this rhythm pattern, most adults who do not read music agree that the figural drawings are better representations of the rhythm than the formal ones (Hildebrandt & Bamberger, 1980). From the point of view of grouping, this is certainly the case. Figural drawings capture the change of pace between fast and slow claps, as well as the repetition of the main rhythmic motives. But from a purely durational standpoint, formal

drawings are more accurate. To test this assertion, one need only to construct a steady, underlying pulse, either at the rate of the shortest events represented by the small symbols, or at the rate of the longest events represented by the large symbols. If this is done correctly, the result should be similar to the formal drawing shown in Figure 2. Here, the underlying pulse acts as a metric grid by which the duration of each event is measured. In the case of the formal drawing presented here, the large triangles receive two units of time and the small ones receive one unit of time.

There is another type of representation which does not appear in the typology presented in Figure 2. This is called a "spatial analogue." Spatial analogues can be constructed by moving a pencil across a page and making a mark at the moment each event occurs. A spatial analogue of the rhythm "three, four, shut the door; five, six, pick up sticks" would look something like the drawing in Figure 3.

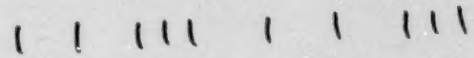

Figure 3. A spatial analogue of the rhythm

Until recently, spatial analogues have presented a problem of interpretation, since the subjects who draw them tend to see different things in them. Since drawings of this type are made both by children and adults, they could be manifestations of three possible levels of representation. They could be examples of drawings that are "played" on the paper without any conscious attention given to the problems of order and correspondence. They could be figural drawings, and many subjects argue that they are by pointing out the groupings of two's and three's across the page. And they could be formal drawings, if the spaces between the marks are what define the rhythm.

Because of the ambiguity of spatial analogues, essentially, they cannot be coded in the absence of additional information, I designed an experiment to examine these representations from a temporal point of view. To this end, a mechanical toy was built that children could set up so that it would play simple rhythm patterns. The toy is a moving spatial analogue in which order, correspondence, speed, and distance can be manipulated by the child with both auditory and visual feedback as a result. With this toy, two types of reversibility can be studied, as well as a number of different strategies for the construction of augmentations and diminutions of simple rhythms.

Experiments with the mechanical toy are part of a larger project which is both a systematic replication of previous work in rhythm representation as well as a new investigation into children's understanding of time in music. The study is designed to investigate the effect of age, type of rhythm pattern, and medium of representation on children's representations of simple rhythms. In this study, there are three age groups (kindergarteners, second graders, and fifth graders), four rhythm patterns (, , ,) and four media of representation (drawings, numbers, circles, and the mechanical toy). For now, I report the results of one part of the study in which children were exposed to levels of representation that were different from their own.

The purpose of this part of the study was to assess the extent to which the developmental typology presented in Figure 2 is structural in nature. The technique that was used in this experiment is similar to one employed by researchers in other areas of development (e.g., Turiel, 1966; Rest, et at., 1969; Kuhn, 1972; Inhelder, Sinclair & Bovet, 1974). In these types of experiments, there are essentially three steps: 1) the child is asked to perform a task; 2) the child is exposed to level(s) of performance on that task that are different from his or her own; and 3) the child is asked to perform the task again. The first step leads to an assessment of the child's initial level of development. The second step leads to an assessment of the child's understanding and acceptance of levels different from his or her own. And the third step makes it possible to observe the direction in which developmental change occurs. According to structural-developmental theory, both performance and understanding on structural tasks should follow a unidirectional sequence of development. Children are expected to understand and accept responses that are at their own level or at the next level of development. Responses at levels below that of the child are expected to be rejected by the child as inadequate. And after exposure to responses at different levels, children's own performances are expected to stay at the same level or to progress to the level that is one step above their own.

In the present experiment, children's initial representations of a simple rhythm pattern were expected to increase with age. Acceptance and understanding of other levels of representation were expected to follow a unidirectional path through the sequence shown in Figure 2. After exposure to different levels of representation, children's subsequent representations were also expected to follow the sequence shown in Figure 2.

Method

Subjects

Thirty children took part in the experiment: 10 kindergarteners (mean age 5;6 years), 10 second graders (mean age 7;8 years) and 10 fifth graders (mean age 9;10 years). The children attended a racially mixed Catholic school in Oakland, California. None of the participants had been given any formal instruction in the reading of music outside a small amount of Kodaly training that had been offered in their singing

class at school. Each interview was conducted individually. All of the sessions were audio or videotaped for subsequent viewing and analysis.

Procedure

The interviewer clapped a rhythm pattern at a tempo of about mm= 100. The children were asked to clap the rhythm pattern back. Then they were asked to represent the pattern using four different media: drawings, numbers, cardboard circles of two sizes, and the mechanical toy. For the most part, the kindergarteners were given the first half of the rhythm pattern and the second and fifth graders were given the whole pattern.

After the children had represented the pattern in four different ways, they were shown examples of what other children had done with the circles. Each example was presented individually by the interviewer using a set of green cardboard circles which measured 1 inch and 1 3/4 inches in diameter. The level 1 representation includes 1-1 correspondence between sound and symbol and serial order of events in time. The level 2 representations include order, correspondence, and figural groupings using either space or size. And the level 3 representations include order, correspondence, and duration using either space or size. All children were shown the examples in the following order: level 1, level 2/space, level 3/space, level 2/size, and level 3/size. For the most part, the kindergarteners were shown half of the sequence and the second and fifth graders were shown the whole sequence. The interviewer put the circles on the table and said, "This is how someone else at your school put the circles out on the table. What do you think of that? Does that make any sense to you? Why or why not? If someone were to walk into the room right now and look at these circles, what do you think he or she would clap?" After the children had commented on each example, they were asked to show the interviewer what they thought would be the best way to represent the pattern using the circles, including ways other than those that they had just been shown.

Results

Interrater reliability was assessed on 30% of the data using two independent raters. All scoring was done directly from the videotapes. The correlation between the scores of the two raters was $r = .80$, $t = 7.27$, $p < .001$.

It was expected that the level of children's initial representations would increase with age. In their first attempt to represent the pattern using the circles, 60% of the kindergarteners did not demonstrate an understanding of 1-1 correspondence between sound and symbol and were subsequently scored at level 0. Forty percent of the kindergarteners and 20% of the second graders made use of order and correspondence and were scored at level 1. Sixty percent of the second and 80% of the fifth graders made use of order, correspondence, accent and/or grouping. These were scored at level 2. There were also several second and fifth graders, 20% and 20% respectively, who made use of

order, correspondence, and duration. These were scored at level 3. Fisher Exact tests were used to compare the difference between the proportion of kindergarteners, second and fifth graders who performed at levels 0 and 1 versus levels 2 and 3. The difference between the kindergarteners and second graders was significant ($p < .001$) as was the difference between the kindergarteners and fifth graders ($p < .001$). There was no significant difference between the second and fifth graders.

According to the hypothesis, children were expected to accept and understand representations at their own level and possibly at levels above their own, but were expected to reject representations that were below their level. In this sample, in addition to understanding representations at their own level, 30% understood and accepted a representation that was one step above their own and 7% understood and accepted a representation that was 2 steps above their own. Seven percent understood and accepted a representation that was below their own. A Chi Square test was performed in order to compare the proportion of children who stayed at the same level or progressed to the proportion of children who regressed. The difference between the two groups was significant ($X^2_1 = 12.17$, $p < .001$). A MacNemar test was performed in order to compare the proportion of children who progressed to the proportion who regressed. The difference between these two groups was also significant ($p < .05$).

After exposure to other levels of representation, children's subsequent representations of the pattern were expected to stay at the same level or to progress in a forward manner. When asked to represent the pattern a second time, 83% of the children constructed a representation that was at the same level as the one that they had originally made. No child constructed a representation that was below the one that he or she had originally made and 17% constructed a representation that was above the one that he or she had originally made. The difference between those children who stayed the same or progressed and those who regressed was significant ($X^2_1 = 18.00$, $p < .001$). The difference between those who progressed and those who regressed was not significant due to the small number of children in the sample.

Discussion

In this experiment, there is evidence for a unidirectional sequence in development with respect to the acceptance and understanding of different types of representations. Most of the flexibility in acceptance and understanding was seen in the second and fifth graders, especially among those who had initially made level 2 representations of the pattern. Of these, nine could understand the level 3 representation using space, but none could understand the level 3 representation using size which is essentially an analogue of standard music notation. The level 3 spatial representation seems to be transparent to many figural thinkers because it maintains motivic groupings in a way that the level 2 representation using size does not. This leads to the conclusion that spatial analogues could be used as transitional

representations for the teaching of rhythm notation to students who do not already know how to read music. However, for students who already know something about standard notation, the spatial analogues might not be as useful. Indeed, the few children in this sample who spontaneously used the Kodaly system to represent the rhythm did not understand the level 3 spatial representation and set up the mechanical toy in a way that was dramatically different from other children their own age. But because of the small number of subjects in question, one can only speculate about the extent to which early training in musical notation affects children's uses of spatial analogues to represent time in music.

The study of spontaneous systems of representation for simple rhythms reveals a wealth of information about how children organize time in music. Results of studies such as these can be used to inform teachers about how to approach the teaching of rhythm notation to children of different ages. One of the strongest findings across studies of this type is the existence of figural modes of representation which are intuitively accessible to both children and adults who have not had prior musical training. Findings like this can begin to account for errors in music reading and writing and show that in many cases these errors are not random, but rule bound in that they employ a system of representation that is sensitive to rhythmic motives and phrases rather than a system that is sensitive to the durations between the onset of each musical event in time. Figural representations can be seen to follow Gestalt rules of similarity and proximity, while formal representations can be seen to follow rules involving the conservation of speed and distance traveled. Knowledge of these two types of representations can help students and teachers achieve a better understanding of the psychological aspects of temporal organization in music. While a spontaneous understanding of the formal aspects of rhythm notation develops later than a spontaneous understanding of the figural aspects, both should be seen as essential elements to be included in a complete representation of rhythm in music.

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The Effects of Verbal Contextual Information on Visual Art Processing[1]

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Most art students have had the experience of sitting in classrooms ready to note the names of artists that match images projected as slides, the titles of those artworks shown, the dates of their production, as well as other noteworthy information regarding each work of art. Although such experiences have more or less contributed to the acquisition of art knowledge, as persons interested in how students learn about art, I suggest we ought to question the type of learning that occurs when artworks are examined in relation to verbalized contextual information. We might ask, for example, does the association of an artist's name with specific artworks enhance the processing and retention of stimulus information? Is it economical from a learning standpoint to encode stylistic characteristics of art on the basis of verbalized labels for styles? Does the title of an artwork provide viewers with an interpretive framework that makes a difference in how a work of art is encoded and stored in memory?

Theoretical models have recently evolved from studies of picture and word encoding characterizing the relationship of verbal processing to the encoding of a picture's meanings and sensory features. Two models, the dual-encoding model and the sensory-semantic model, have been particularly useful in predicting the effect of verbalization on the processing of pictorial stimuli. According to the dual-encoding model (Paivio, 1971, 1978) verbalizing about a picture at input increases the likelihood that dual codes are established as memories of the stimulus. The assumption is that sensory features of the object are stored in an analogue imagery code, while the products of phonemic processing are stored in a verbal or linguistic code. The redundancy of stored information in multiple codes increases the probability that the stimulus will be remembered in that two codes are better than one.

In contrast, the sensory-semantic model formulated by Nelson, Reed, and McEvoy (1977) follows the levels of processing hypothesis (Craik & Lockhart, 1972) in predicting that verbalization about a picture requires prior analysis of its structural features and meanings. Verbalization ensures that meaning is encoded during semantic processing which is, in turn, associated with the formation of more elaborate and longer lasting memories of the stimulus. Rather than attributing the merit of verbally processing pictorial stimuli to the amount of

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[1]The present study served as preliminary research for a subsequent investigation presented to the National Art Education Association, Miami, April 1984, and submitted for publication in Studies in Art Education (co-authors: K. Desmond & S. Brandon).

information that gets encoded as proposed by the dual-coding model, the sensory-semantic model predicts it is the type of information that gets encoded when viewers talk about pictures that results in improved retention.

Although both theoretical models have stimulated considerable research in psychology, none outside my own has been initiated to test the predictions of either model as they apply to the process of viewing works of art. That is not particularly surprising given the complexity of art stimuli. Artworks can be encoded and verbalized in ways that maintain direct reference to the visual or structural information, for example by size, shape, textures, and color, that physically resides in an art object--information that is readily available for encoding to any viewer with normal vision. To process meaning, on the other hand, requires that information immediately present as visual stimuli be interpreted as "standing for" what is not immediately present. Visual features provide access to semantic information, yet this accessibility is manipulated in art through abstraction. This, of course, often makes it very difficult to determine what a work of art "stands for" unless contextual clues are available to provide a direction for interpretation.

It might furthermore be speculated that the accessibility of meaning from art may also be a function of the type of media used to create a work--not because one medium is more "readable" than another, but because viewers' expectations may differ when confronting one artwork from the next. What I am suggesting here is that viewers may differ in responding to, say photographs, than to drawings or other two-dimensional art forms. This thought comes to mind when considering the difficulty often noted when students fail to consider the distance between a photograph and its real-world referents. As Barrett (1983) put it, photographs are regarded with this degree of credibility because, unlike other artforms, they are linked to a particular time and space in the real-world by their causal dependence on light reflecting from objects to light sensitive materials.

Of interest to the present study is whether significant differences occur when processing photographs versus drawings in the presence or absence of verbal contextual information. If differences do exist, it is hypothesized they are a function of abstraction effects and the type of contextual information given to viewers. Verbal labels that literally describe objects, persons, or events depicted in an artwork ought to elicit semantic encodings that differ from those elicited by verbalized references to expressive qualities and/or other nonliteral aspects of the content depicted in a work of art.

Four between-subjects groups were formed in the present study to test these predictions. They consisted of verbal context conditions in which artworks were presented to viewers with instructions (1) to examine each work in relation to its original artist-generated title (correct title condition), (2) to consider each artwork in relation to a misleading experimenter-generated title (erroneous title condition), (3) to view each work of art and formulate an appropriate title of their own (generate title condition, or (4) to study each artwork for

which no title was given (no title condition). Titles were used as contextual clues because they provided descriptive and interpretive references to the semantic characteristics of artworks in a succinct form.

Method

Design and Subjects

Four levels of Title Context (correct title vs. erroneous title vs. generate title vs. no title) were manipulated as between-subjects variables. Abstraction Level (low, medium, high), Media (drawings, photographs), and Title Type (descriptive, interpretive) were treated as within-subjects variables on tests of structural recognition, structural recall, and semantic retention. The experimental design was thus a 4 (Title Context) x 3 (Abstraction Level) x 2 (Media) x 2 (Title Type) factorial with repeated measures on the latter three variables.

Sixty-four undergraduates attending The Ohio State University volunteered to participate in the experiment. The subjects were elementary education majors with no other background in photography and the visual arts than the art education methods course in which they were currently enrolled.

Materials

Visual art stimuli. Twenty-four artworks (12 photographs and 12 drawings) produced by European and American artists during the 20th century were reproduced as black and white photographs, measuring 8 x 10 inches, for use in the experiment. An equal number of the photographs and drawings displayed low, medium, and high levels of abstraction as rated by a panel of 3 independent judges with advanced degrees in the visual arts.

Title contexts. Descriptive and interpretive titles were prepared to accompany artworks at presentation and for use on the semantic retention test. Descriptive titles literally referred to depictions of objects, persons, or events (e.g., Child with [illegible]y Hand Grenade in Central Park, Revolving Door, Fruit Trees in [illegible]oom), while interpretive titles characterized expressive qualities and/or other nonliteral aspects of depicted content (e.g., Escape, The Heritage of Motherhood, Muscular Dynamism). Original artist-generated titles were presented to subjects in the correct title condition. Erroneous titles paralleling descriptive and interpretive dimensions of artworks were prepared by the experimenters to mislead subjects in the erroneous title condition. Unlabeled reproductions were presented in the generate and no title conditions, however, instructions directing subjects to formulate their own title while viewing each work of art were included in test booklets prepared for the generate title group.

Dependent measures. The structural retention tests developed by Koroscik and Blinn (1983) were adapted for use in the present study. Structural recognition was measured by asking subjects to determine whether six visual items appeared in the artwork just viewed. Four of

the test items were one-sixteenth segments from four different quadrants of the artwork, while the remaining two items were made with a yes-no indication of whether it was recognized as a segment from the presented artwork. Subjects were also asked to rate their confidence in each recognition response on a scale from one (no confident) to five (extremely confident).

Subjects were then asked to recall the exact location of those recognized items by marking their correct location with the artwork on a 16 segment grid. Confidence ratings indicating the correctness of each recall response were also requested from participants.

Semantic retention was measured by presenting subjects with six titles for each work of art, half of which were descriptive and the other half were interpretive. Two titles matched the artwork as original artist-generated or similarly correct titles; two titles somewhat matched the works as experimenter-generated titles that paralleled semantic characteristics but in a misleading way; and two titles did not match the artworks whatsoever as title matches for works substantially different in structure and meaning. For example, titles used in testing the semantic retention of P. Mondrian's drawing, Apple Tree, were as follows:

1. Apple Tree (descriptive, matches)
2. The Underlying Structure of Nature (interpretive, matches)
3. Church Facade (descriptive, matches somewhat)
4. Spiritual Jubilee (interpretive, matches somewhat)
5. Side of Beef (descriptive, does not match)
6. The Dream (interpretive, does not match)

Test titles were unanimously agreed upon by the experimenters and validated by a review of literature on each artist's work.

Subjects were asked to determine whether each title matched, matched somewhat, or did not match the artwork just examined and to rate their confidence in each response. Since subjects in the correct title and erroneous title groups were given corresponding titles from the retention test at presentation, they were asked to record the name of that title in their test booklets just prior to taking the test. All subjects were instructed to match titles on the basis of their perceptions of the work, and to disregard any title previously associated with the work of art that may be inconsistent with such perceptions.

Results

Structural Recognition

Subjects' performance in recognizing reproduced segments of the artworks they viewed was compared in a 4 (Title Context) x 3

(Abstraction Level) x 2 (Media) x 2 (Title Type) analysis of variance. The statistically significant differences indicated were as follows: Abstraction Level, F (2, 120) = 36.28, $p < .0001$; Media, F (1, 60) = 12.79, $p < .0007$; Title Type, F (1, 60) = 43.13, $p < .0001$; Abstraction x Media, F (2, 120) = 14.54, $p < .0001$; Abstraction Level x Title Type, F (2, 120) = 46.22, $p < .0001$; Media x Title Type, F (1, 60) = 53.45, $p < .0001$; Abstraction Level x Media x Title Type, F (2, 120) = 26.55, $p < .0001$; Title Context x Abstraction Level x Media x Title Type, F (6, 120) = 3.79, $p < .002$.

Structural Recall

The specificity of subjects' memory for structural aspects of the artworks they viewed was assessed in a 4 (Title Context) x 3 (Abstraction Level) x 2 (Media) x 2 (Title Type) analysis of variance. This analysis of structural recall scores indicated significant differences for the following main effects and interactions: Abstraction Level, F (2, 120) = 65.98, $p < .0001$; Media, F (1, 60) = 27.04, $p < .0001$; Title Context x Abstraction Level x Media, F (6, 120) = 2.17, $p < .05$; Abstraction Level x Title Type, F (2, 120) = 36.71, $p < .0001$; Media x Title Type, F (1, 60) = 14.55, $p < .0003$; Abstraction Level x Media x Title Type, F (2, 120) = 11.17, $p < .0001$.

Semantic Retention

Semantic retention was rated on a variable scale by considering the extent to which subjects incorrectly matched titles to artworks on the semantic retention test. Results of analysis on 4 (Title Context) x 3 (Abstraction Level) x 2 (Media) x 2 (Title Type) x 2 (Error Type) indicated significant main effects and interactions as follows: Title Context, F (3, 60) = 4.58, $p < .0061$; Abstraction Level, F (2, 120) = 81.83, $p < .0001$; Media, F (1, 60) = 60.00, $p < .0001$; Error Type, F (1, 60) = 24.28, $p < .0001$; Abstraction Level x Media, F (2, 120) = 30.97, $p < .0001$; Abstraction Level x Title Type, F (2, 120) = 3.81, $p < .025$; Media x Title Type, F (1, 60) = 4.95, p .03; Media x Error Type, F (1, 60) = 4.89, $p < .031$; Title Context x Media x Error Type, F (3, 60) = 4.72, $p < .005$; Abstraction Level x Media x Error Type, F (2, 120) = 5.90, $p < .004$.

Post Hoc Analyses

Results of the structural recognition, structural recall, and semantic retention tests were further analyzed in post hoc comparisons of means. All significant findings were analyzed with the exception of the four-way interaction that was indicated for structural recognition scores. The higher order interactions that reached statistical significance in each of the three tests most clearly pictured the differences among variables, thus this report was limited to their description. Results of post hoc analyses are presented in Tables 1 through 4 in a format that identifies significant differences among means for each form of the dependent measure in order by title context, title type, abstraction level, and media effects, respectively.

Table 1
Results of Post Hoc Comparison of Title Context Effects

Semantic Retention Error

Title Context x Media x Error Type

CORRECT (1.69) < ERRONEOUS (2.33): dwgs, descriptive error*
CORRECT (1.69) < GENERATE (2.41): dwgs, descriptive error*
CORRECT (2.56) < GENERATE (3.37): photos, interpretive error*

Means are given in parentheses; *$p < .05$; **$p < .01$.
Note. Nonsignificant differences were indicated among title context conditions for structural recall stores; differences among structural recognition means in the Title Context x Abstraction Level x Media x Title Type interaction were not further analyzed.

Table 2
Results of Post Hoc Comparison of Title Type Effects

Structural Recognition

Abstraction Level x Media x Title Type

DESCRIPTIVE (41.98) > INTERPRETIVE (35.69): low abstract, photos**
DESCRIPTIVE (51.08) > INTERPRETIVE (28.47): high abstract, photos**

Structural Recall

Abstraction Level x Media x Title Type

DESCRIPTIVE (20.97) > INTERPRETIVE (10.19): low abstract, dwgs**
DESCRIPTIVE (9.02) > INTERPRETIVE (2.08): high abstract, dwgs**
INTERPRETIVE (23.09) > DESCRIPTIVE (16.31): low abstract, photos**
INTERPRETIVE (19.44) > DESCRIPTIVE (10.78): medium abstract, photos**
DESCRIPTIVE (12.23) > INTERPRETIVE (4.02): high abstract, photos**

Semantic Retention Error

Media x Title Type

DESCRIPTIVE (2.43) < INTERPRETIVE (2.84): dwgs**
DESCRIPTIVE (2.25) < INTERPRETIVE (2.89): photos**

Means are given in parentheses; *$p < .05$; **$p < .01$.

Table 3
Results of Post Hoc Comparison of Abstraction Level Effects

Structural Recognition	
Abstraction x Media x Title Type	
LOW (44.33) > HIGH (37.53) = MEDIUM (35.13):	dwgs, descriptive title**
LOW (43.08) > HIGH (38.16) = MEDIUM (38.00):	dwgs, interpretive title**
HIGH (51.08) > LOW (41.98) = MEDIUM (30.94):	photos, descriptive title**
Structural Recall	
Title Context x Abstraction Level x Media	
LOW (14.97) > HIGH (6.50):	correct title, dwgs*
LOW (13.78) > HIGH (4.34):	erroneous title, dwgs**
LOW (15.81) > MEDIUM (5.91) = HIGH (4.94):	generate title, dwgs**
LOW (17.75) > HIGH (6.41):	no title, dwgs**
LOW (22.47) > HIGH (5.59):	correct title, photos**
LOW (22.16) > HIGH (9.09):	erroneous title, photos**
LOW (17.34) > HIGH (7.44):	no title, photos**
Abstraction Level x Media x Title Type	
LOW (20.97) > HIGH (9.02) = MEDIUM (6.48):	dwgs, descriptive title**
LOW (10.19) = MEDIUM (11.95) > HIGH (2.08):	dwgs, interpretive title**
LOW (23.09) = MEDIUM (19.44) > HIGH (4.02):	photos, interpretive title**
Semantic Retention Error	
Abstraction Level x Media x Error Type	
LOW (1.71) < MEDIUM (2.58) < HIGH (3.30):	dwgs, descriptive error**
LOW (2.16) < MEDIUM (2.86) < HIGH (3.20):	dwgs, interpretive error**
LOW (2.31) < HIGH (2.55):	photos, descriptive error**
LOW (2.53) = MEDIUM (2.64) < HIGH (3.15):	photos, interpretive error**

Means are given in parentheses; *$p < .05$; **$p < .01$.

Table 4
Results of Post Hoc Comparison of Media Effects

Structural Recognition	
Abstraction Level x Media x Title Type	
PHOTOS (51.08) > DWGS (37.53):	high abstract, descriptive title**
DWGS (43.08) > PHOTOS (35.69):	low abstract, interpretive title**
DWGS (38.00) > PHOTOS (32.91):	medium abstract, interpretive title**
DWGS (38.16) > PHOTOS (28.47):	high abstract, interpretive title**
Structural Recall	
Title Context x Abstraction Level x Media	
PHOTOS (22.16) > DWGS (13.78):	low abstract, erroneous title*
Abstraction Level x Media x Title Type	
PHOTOS (23.09) > DWGS (10.19):	low abstract, interpretive title**
PHOTOS (19.44) > DWGS (11.95):	medium abstract, interpretive title**
Semantic Retention Error	
Media x Title Type	
PHOTOS (2.25) < DWGS (2.53):	descriptive titles*
Title Context x Media x Error Type	
DWGS (1.69) < PHOTOS (2.64):	correct, descriptive error**
DWGS (2.59) < PHOTOS (3.37):	generate, interpretive error**
DWGS (2.35) < PHOTOS (3.04):	no title, interpretive error*
Abstraction Level x Media x Error Type	
DWGS (1.71) < PHOTOS (2.31):	low abstract, descriptive error*

Means are given in parentheses, *$p < .05$; **$p < .01$.

Discussion

The significance of these findings to art education is linked to the question of how students acquire knowledge when viewing works of art. Results indicated the retention of visual art structures was associated with their meanings. Verbalization ensured that meaning was processed to some extent, thereby facilitating the retention of semantic information which, in turn, promoted the retention of structural features. Such findings are in line with predictions of the sensory-semantic model of encoding (Nelson, et al., 1977).

Results also showed meanings were somewhat more accessible for processing when viewing drawings than when responding to photographs. However, the accurate interpretation of either artform was to a greater extent a function of abstraction level differences and the type of contextual information given at presentation.

It seems evident from these and previous findings (Koroscik, 1982; Koroscik & Blinn, 1983) that semantic encodings are usually formed in the processing of structural art information. Viewers apparently always "effort after meaning" as Bartlett (1932) once noted. The processing of semantic information is, however, often inaccurate, particularly when students view highly abstract works of art, unless they comprehend the correspondence between what is said about a work of art and its structural and semantic characteristics.

Curricular decisions that might be re-examined in light of these findings pertain to the selection of artworks presented to students and to the type of verbal information that accompanies each work. As art educators, we cannot assume students see the relationship between a work of art and verbal references to it, especially if such verbalizations are interpretive in nature.

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The Relationship of Symbolic Representation and Verbal Description with Varying Media[1]

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Children's depictions, especially drawings, are used for all sorts of diagnostic and evaluative purposes. Stages in human figure drawings have called attention to the cognitive bases of drawing (e.g., Golomb, 1973; Piaget & Inhelder, 1969). This perspective on drawing is frequently contrasted with a perceptual-esthetic view (Arnheim, 1954), which suggests that children's depictions are creative solutions to their encounters with representational materials. Logic and evidence have accumulated to leave us with a complicated set of ideas about the development of symbolic forms; there are cognitive, perceptual, esthetic, and performance aspects to depiction. Yet, except for human figure drawing, we have little descriptive data on children's production of different objects with different materials (Freeman, 1980). We have no way of interpreting what children produce or comparing those productions with one another.

This paper presents some preliminary analyses from a larger study of early representation. That larger study will address the normative development of symbolic representation, as influenced by the media of representation and by the referent or object being depicted. The current analyses focus on the information included in depictions. Specifically, we will explore the relationship between the extent of the child's verbal knowledge of common objects, what they actually depict, and what they verbally describe in those depictions. This is essentially an exploration of the stereotypic production of objects that are commonly depicted by children (Goodnow, 1977).

Some investigators have dismissed the informational aspect of depictions. For example, Freeman (1980) argues against the Piaget/Luquet interpretation of drawing, commenting that children surely know more than they draw or depict. He dismisses cognitive sources of symbolic representation, other than those cognitive sources that relate to the perception and denotation of spatial relations. Information, such as knowledge of parts, is minimized as relevant data pertaining to depiction.

McNamara and Porterfield (1969) provide contrary evidence in their analysis of the human figure drawings of disadvantaged preschoolers. They found that drawings correlated highly with the child's identification of body parts on a model. Knowledge of body parts

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[1]This research was supported by a number of grants from the University Research Institute at The University of Texas at Austin. Thanks to Margaret Garza, Sandy Briley, and Liz Strand, who assisted in data collection and coding.

related positively with higher level drawings. Information was seen as a significant contributor to the depictions.

These conflicting perspectives are complicated by current research on media and symbolic representation. Gardner and Wolf (1979) have demonstrated in a number of papers that depictive materials can be a major influence on children's productions. Among the waves, streams, and currents of symbolic representation, they refer to the child's use of each medium as a separate stream that may flow independently of other media streams. What a child reveals in a drawing of a house may not be shown in a sculpture or in a verbal description. The idea that each medium of representation provides different information about a referent is consistent with Golumb's (1973, 1974) findings on human figure depiction with various materials.

Other researchers have argued that materials are an irrelevant variable in depiction. Brittain (1979; Brittain & Chien, 1980) had children depict human figures with a variety of materials. Based on the relatively high correlations between scores for these depictions, Brittain concluded that medium of production is irrelevant as a variable.

Another relevant phenomenon to consider when inspecting children's depictions is their tendency to "read off" parts of their creations (Golomb, 1972). That is, children at an early stage of representational depiction will insist that they have created a form when they have not done so; they supply a verbal designation for whatever they have not, in fact, shown. They pretend that something is there. This can be seen when the child claims that a stick man has clothes on, or when a pretend window is referred to on the flat wall of a building block house. This kind of imagining of what has been depicted may play a role in the child's transition from mental representation to depiction. How extensive this phenomenon is is not yet known. How it operates with different representational media is also unknown.

The contrary positions on the influence of information and of media on representational depiction are further complicated by the fact that virtually all of the research done to date has looked at human figure depiction. The typical human figure is bilaterally symmetrical with a dominant polar axis. Parts of the human body are commonly labeled for young children. These spatial and informational features are presumably well known to the child. The question of how children might deal with referents of different magnitude and complexity, for example, a house and a tree, remains. This would provide a comparison of objects that are perceptually common, if dramatically different in size and structure.

Freeman (1980) has commented that we do not yet have any way of comparing one form of representation with another. The current study was designed to provide a descriptive basis for such a comparison. The purpose of the study was to assess the development of children's depictions of persons, houses, and trees, making use of a variety of representational media. Data reported here will focus on the child's verbal articulation of information about the referents and the different symbolic representations created by the child.

Method

Subjects

Children were selected from participants in full-day child care programs operated in the public schools and in church-affiliated schools. Thirty boys and 30 girls were randomly chosen to form each of 3 age groups, as follows: Age Group 1 (n = 22, mean age = 62.73 months, range = 48-71, SD = 6.79), Age Group 2 (n = 19, mean age = 86.47 months, range = 76-95, SD = 5.89), Age Group 3 (n = 19, mean age = 106.32 months, range = 96-119, SD = 6.56). The proportion of boys and girls in each age group was as nearly balanced as possible. The sample was ethnically mixed, but all children came from homes where English is the dominant language. Children identified by teachers as being physically disabled or performing off grade level were not included in the sample.

Procedure

A female graduate student research assistant became familiar to the children by participating in their classrooms for a number of days. She was unfamiliar with the purposes of the study. Over a period of 3 to 4 days, usually within one week, each child was taken individually to a room in the school where the following four materials were arranged on separate child-size tables: one set of table-top building blocks, a 6-ounce lump of gray plasticine, sheets of 11" x 14" drawing paper with colored markers, and an easel on which 12" x 18" paper was posted by 6 colors of poster paint. The child was invited to play with each of the materials. The order in which each child began using the materials in each session was randomly varied, to avoid order effects, then subsequent materials were presented in a counterbalanced sequence. During the first day's session, the child was allowed to practice by producing any desired product with each material, to become comfortable with the materials and the situation.

After the child completed practice, the researcher asked the child to return to the first material, where the child was requested to make the best person, house, or tree that could be made. The first session's symbol was randomly varied from child to child; subsequent sessions' symbols were requested in a rotated sequence. When the child completed a representation with a material, the researcher asked for a complete description of the representation. The child was asked to go to the next material, where the request for a representation was repeated until the child had produced and described the symbol with each material. The child was then shown a model of the symbol, a picture of a child, a tree, or a miniature model of a house, and asked to describe its constituent parts. If the child did not mention parts of the model, for example, the arms on the child picture, the researcher asked the child to point to those parts on the model. After eliciting the verbal description and recognition of the referent, the researcher asked the child to make any desired additions or changes to the representations.

Photos were taken of block and clay products; multiple pictures were taken to show all sides of the representation and the interior, if an interior was included. Drawings and paintings were saved for direct coding.

Measures

A point scale was used to assess each child's representation of the person, house, and road. One point was given for each visible person part: head, torso, legs, arms, face features, hands, feet, hair, clothes. If, for example, one hand was represented, the full point was awarded. One point was given for each visible house part: wall, roof, door, window, chimney, floor. One point was awarded for each tree part: crown, leaves, trunk, roots. This scale was used for each child's depiction, the child's verbal description of the depiction, and the child's verbal description of the model of the referent.

Reliability

Two graduate students independently inspected each child's drawings, paintings, and photos of block and clay representations. They used the point system described above to score each representation. No point was given if a part was not visible. The two judges point-ratings were correlated, resulting in an overall agreement of .73.

Results

Three measures are of interest for this presentation: the number of parts actually depicted, the number of parts verbally described for that depiction, and children's verbal recognition of parts of a presented model. Each of these measures was taken for depictions of a human figure, a house, and a tree, with depiction and verbal description of depiction measures taken for each medium. With regard to the actual depictions, a MANOVA was conducted for each of the three referents, in a 4 (media) x 3 (age group) x 2 (sex) analysis. There was no effect or interaction with sex, so it was eliminated from further analyses.

Person

The multivariate analysis for person revealed a main effect for media ($F(4,51) = 335.38$, $p < .0001$) and an interaction between media and age ($F(8,102) = 4.75$, $p < .0001$). Seven of the 8 univariate analyses for media were significant at the .001 level, with one univariate (blocks x age) analysis approaching significance (see Table 1). Subsequent t-tests compared depiction scores to verbal description of depicted persons and to verbal description of a model person. As Figure 1 shows, virtually all children at all ages shared common information on the models' parts. With few exceptions children knew significantly more than they depicted (except for drawings of the older two groups). With few exceptions, they described significantly more parts of their own depictions than they actually produced, except for drawings of the older two groups. The table reveals the development of a relative pattern of depiction and labeling.

House

The multivariate analysis for house revealed a main effect for media ($F(4,51) = 231.32$, $p < .001$) and an interaction between media and age ($F(8,102 = 2.52$, $p < .02$). Again, 7 of the 8 univariate analyses were significant, with only the block x age univariate analysis not significant (see Table 1). Again, subsequent t-tests were conducted indicating a similar pattern for houses as for persons. Virtually all children at all ages knew the specified house parts. In all cases, children knew significantly more than they depicted. In only one case, drawings of age group 2, did children not describe more than they actually depicted. The pattern for house depiction is similar to the pattern for person depiction.

Tree

The multivariate analysis for tree revealed a main effect for media, only ($F(4, 51) = 272.25$, $p < .001$. There was no effect for interaction of media and age. All of the univariate analyses for media were significant (see Table 1). Subsequent analyses of the tree data are problematic; with a total possible score of 3, there is a numerically restricted range of responses. Findings showed that there was some increase in the store of verbal information younger children have about tree parts; group 1 labeled a significantly smaller average number of model parts than did group 3. Children in group 3 only knew significantly more than they depicted. In a few cases, children depicted more parts than they labeled. In one medium, blocks, younger children actually depicted more than they knew verbally.

Discussion

A number of patterns emerge from this data. With few exceptions, depictions reveal significantly less information than a verbal description of a given model. Children depict more of what they know as they grow older, but that information is not entirely reflected in depiction with any medium, although it approaches it with drawing. Related to this is the overall pattern of verbally describing one's own depiction in more detail than the depiction actually shows. Children as old as age 9 will say that they have depicted more than they have done. This is true of all media, except drawings by children at older ages.

These findings tend to support Freeman's (1980) contention that information plays only a minor role in symbolic representation, at least for stereotypic objects like persons, houses, and trees. Besides the obvious fact that there must be information in a representational depiction, amount of information is not a major factor influencing children as they depict. Children must rely on some internal store of knowledge, but that store may not directly shape their depiction (Kosslyn, Heldmeyer & Locklear, 1977). The pattern of findings presented here suggests the need to investigate the process that guides the selection of depicted information in a variety of media.

Clearly, media do influence children's depictions. The MANOVA and subsequent analyses reveal differing patterns of depiction with

different materials. This appears to be consistent with Golomb's (1973, 1974) findings on the influence of materials on human figure representation and with Gardner's work. At this point it is difficult to say much more than this. Further analyses of the data will look at structural relationships in addition to just information included by children. This will provide a better idea of how parts are depicted in relationship to one another with different materials, and not just whether parts are depicted or not (Golomb, 1973; Reifel & Greenfield, 1982, 1983).

It is apparent that children do "read off" a significant number of parts of their depictions, as Golomb (1972) described. Verbal statements of non-depicted parts are a major part of symbolic representation, well into the middle childhood years. The possible role of imagined parts in children's depictions has not been explored. It is possible that the child may use such verbal designators to compensate for deficient skills in production, or they may function to direct the child toward the differentiation of parts that will be dealt with in future creative attempts. Again, the magnitude of "reading off" appears to vary with the material a child uses for depiction. The interplay of image, verbal awareness, and symbolic representation needs to be further explored.

These findings will be combined with other analyses of the depictions. It is hoped that they will provide a descriptive basis for the further study of how children search for meaning as they explore with various media.

Table 1
Univariate Analyses

	Media Effects		Media x Age Effects	
	$F(1,54)$	$p <$	$F(2,54)$	$p <$
Person				
Blocks	383.60	.001	2.79	.07
Clay	412.12	.001	12.70	.001
Drawing	1311.30	.001	7.87	.001
Painting	550.73	.001	13.04	.001
House				
Blocks	565.65	.001	2.03	n.s.
Clay	171.40	.001	4.55	.02
Drawing	766.23	.001	3.98	.02
Painting	401.13	.001	9.67	.001
Tree				
Blocks	837.11	.001	1.56	n.s.
Clay	468.81	.001	0.73	n.s.
Drawing	701.66	.001	3.11	.05
Painting	666.87	.001	0.74	n.s.

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Photographs, Contexts, and Interpretations

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The meaning of any photograph is highly dependent on the context in which is appears. Freund (1980) discusses a photograph by Robert Doisneau which pictures a man and a woman drinking wine at a bar in a Paris cafe. Doisneau was fond of cafes and seeing the two together was charmed and asked if they would allow themselves to be photographed. They consented and his photograph of them was published as part of a photo essay on Paris cafes in a mass circulation magazine, Le Point. Sometime later, without Doisneau's consent, the same photograph appeared in a brochure on the evils of alcohol abuse published by a temperance league. Still later, and still without Doisneau's consent, the photograph again appeared, this time in a French scandal sheet with the caption: "Prostitution in the Champs-Elysees." All three presentations were convincing; the third convincing enough that the gentleman in the photograph sued the scandal sheet and was awarded recompense (Freund, 1980). Fourth and fifth contexts for the same photograph which Freund does not mention are the photography galleries of the Museum of Modern Art in New York, and a book, Looking at Photographs: 100 Pictures from the Collection of The Museum of Modern Art, by the museum's photography curator, John Szarkowski (1973). In the galleries the photograph hangs matter, framed, and under glass with the usual wall label of artist and date. In his brief essay accompanying the reproduced photograph in his book, Szarkowski offers an interpretation of "secret venial sins of ordinary individuals," reading the picture as "a potential seduction" (Szarkowski, 1973, p. 173).

The popular magazine, the temperance league brochure, and the scandal sheet are three very different presentational environments for Doisneau's photograph which in themselves orient how viewers are to understand the photograph, even apart from any captions or accompanying articles. The surrounds of the popular magazine would probably give the picture an atmosphere of lighthearted innocence; the temperance league brochure in itself points a morally judgmental finger at the picture; and the scandal sheet automatically dredges the photograph into the realm of gossip and gossip which is scandalous and thus newsworthy. The texts which surround the photograph eliminate any residual ambiguity and determine how the picture is to mean. As factual as journalistic photographs are commonly assumed to be, this one is shown to be readily amenable to three significantly different readings.

The fourth and fifth contexts present Doisneau's photograph as serious art. Hanging in an austere and quiet gallery of the Museum of Modern Art adjacent to other revered works of modern masters of the medium of photography, the photograph is framed with dignity and is uncluttered by captions, headlines, or mastheads, accompanied only by a label, Robert Doisneau, French, born 1912, At The Cafe, Chez Fraysse, Rue de Seine, Paris, 1958. The photograph's placement in the gallery is above all a tribute to the sensibilities of its maker, Robert Doisneau. It is there to be compared to other photographs and to the

collected and preserved works of other modern masters in other art media.

In his four paragraphs accompanying the photograph in Looking at Photographs, Szarkowski (1973, p. 173) opens his essay with speculations about Doisneau in relation to other photographers, stating that "Doisneau actually likes people, even as they really are." Szarkowski bases his interpretation of the image as picturing a potential seduction on evidence internal to the picture. Szarkowski backs his imaginative interpretive claims with pictured information: the woman appears younger than the man, he appears to be gazing at her longingly, she looks more confident, and one of the two wine glasses before his is empty although her two are near full. These observations, however, do not automatically add up to an attempted seduction but Szarkowski observes, "a picture is about what it appears to be about" (p. 173) and he renders how it appears to him convincing to us. Nevertheless, the man could have been looking past the woman and could have been talking to another outside of the frame. The two in the picture may have only been placed "together" by Doisneau's viewfinder.

Important points to consider can be drawn from these examples. The most obvious but not unimportant is that photographs made for one purpose are often used for other purposes. A photograph of the planet earth made from outer space by NASA as part of its space exploration program is used by the Mobil Oil Corporation to promote its petroleum products and enhance its corporate image: with the addition of a minimum amount of copy and a logo a scientific photograph has been turned into a classy magazine ad. Images of fallopian tubes, a living 15-week-old embryo, and greatly magnified miniscule sections of animal tissue by Sweden's medical photographer, Lennart Nilsson, have been bound together into a lush book, an aesthetic object for coffee tables. Photographs of executed prisoners still strapped to their chairs have graced museum walls; once made as state documents they are exhibited as items in the history of the art medium of photography in Ohio.

These and the various uses put to Doisneau's photograph are instances of category displacements: with the addition of surrounding or superimposed texts, images are switched from the category of news to a moral indictment; by switching a photograph from a laboratory file drawer to an oversized book, science becomes art. Often these seem harmless enough gestures, or beneficial ones: many objects or images may be apprehended for the aesthetic pleasure they may yield. Displacements of photographs from moral categories to aesthetic categories, however, are cause for concern, most generally, a concern over the "aestheticizing" of humanly reprehensible situations and events (Sontag, 1977; Benjamin, 1934; Sekula, 1978; Crimp, 1981).

Another important point to be drawn from the Doisneau example is that photographs, despite their usually great specificity of information, are relatively indeterminate in meaning. The idea that photographs are relatively indeterminate runs counter to a cultural myth that has grown up with photography, namely, that photographs constitute a universal language (Sander, 1930). August Sander, the influential German photographer working in the 1930's, helped popularize this myth

in a radio broadcast series, one of the lectures of which was titled "Photography as a Universal Language."

It is easy to alter the meanings of a photograph, generally by altering the contexts in which it is shown, specifically by adding text. It is surprising, though how convincingly the same photograph can be used to support and is accepted as supporting different, even contradictory, readings. Photographs too easily are seen as transparent, unmediated, mechanical transcriptions of reality--bare facts, as it were, that are infinitely mutable by theory or point of view, be it the temperance league's or the gossip editor's or the museum curator's. Once given a point of view by context they are convincing as anonymous and authoritative facticity.

Lastly, something need be said about adjudicating among the competing interpretations surrounding the Doisneau photograph or any others. The first thing that needs to be made explicit is that a photograph's presentational environment is a form of interpretation, sometimes vaguely and with lack of specificity as when the photograph is hung on a gallery wall, and sometimes unequivocally as when the photograph is given a headline of "Prostitution." As any interpretation ought to be evaluated so ought any picture's presentational environment. Is Doisneau's photography equally about cafe life, alcohol abuse, prostitution, the art of photography, and seduction? Are any of these wrong? Are all of these fair? Which of these are the more plausible, enlightening, accurate? What follows are concluding considerations concerning photographs, contexts, and interpretations.

Based on internal evidence, what is shown in the picture, and experience of the world, the interpretations of the picture which imply alcohol abuse or prostitution are unwarranted. Although either person pictured could be an alcoholic, could be abusing the substance, or could be inebriated, there is no evidence in the picture that any of these is the case. There are no signs of drunkenness; neither seem exhilarated or stupified as a consequence of their intake of wine. Photographs more clearly connoting alcohol abuse could have easily been found or made. Nor is there any information in the picture that either of these people are involved or seeking to be involved in an act of prostitution. At the instant pictured the male is active and the female is passive, appearing to be considering something he has said. If he is offering his services, it is unlikely that he will succeed, not having the physical attributes socially desirable for a male prostitute. She does not seem to be pursuing him: her posture is self-contained and protective. Nor does she have the look of a prostitute: her nails are unpolished, her make-up subdued, her hair humbly styled, and her attire quite modest. Again, photographs more clearly connoting prostitution would have been easy to find or make. If information about the situation of the photograph's making is considered, both of these interpretations are easy to dismiss as unwarranted. It is not likely that Doisneau would have received permission to photograph the two if they were involved in prostitution or drunkenness, particularly since the pictured gentleman, as a local teacher, had a professional reputation to protect.

The three remaining interpretive contexts are better founded and therefore less problematic. Doisneau is fond of cafes and frequently photographs them. That this picture appeared in a popular magazine as part of an issue devoted to cafes with others of Doisneau's cafe photographs does not present interpretive difficulties. Nor does its appearance on a wall of a photography gallery of a major museum present particular problems, although this context definitely changes the picture's posture. Szarkowski's interpretation of the photograph as a picture of a potential seduction has a whimsical flavor to it. He first posits that in fact the man could be telling the woman that he no longer needs her at the show, but Szarkowski (1973) adds: "Regardless of historic fact, however, a picture is about what it appears to be about, and this picture is about a potential seduction" (p. 172). He then supports his interpretation with observations about what is pictured. Szarkowski's interpretation combines what is pictured and his awareness of body posture, social conventions, and general knowledge of male, female interactions. His observations are clearly interpretive and are argued with support evidence. In this important respect his interpretive presentation of this photograph is different than those of the temperance league and the scandal sheet: the former's is by implication and the latter's is by a declaring headline. Both of these are devoid of argument and are implicitly rather than explicitly interpretive and do not invite counter-argument as does Szarkowski's. In this respect, at least, they are dangerous proclamations relying primarily on the anonymous authority of the printed word.

In positing interpretations or in adjudicating among implicit or explicit interpretations three sources of information are available for examination: information evident within the picture, information surrounding the picture in its presentation, and information about the picture's making. Each of these intersect with each other and influence our experience of pictures; each of these contain potential evidence for positing meaning; each of these should be examined before final conclusions are drawn. These sources may be called the picture's "internal context," "external context," and "original context." Internal context includes the picture, its title, if it has one, date, and maker. External context refers to the picture's presentational environment. Original context refers to the picture's causal environment, namely that which was physically and psychologically present to the maker at the time the picture was made.

An examination of internal context entails attention to the picture's subject matter and form, positing connotations on the basis of denotations, and deciphering content on the basis of subject matter and form. For a suitably accurate understanding some photographs do not necessitate much investigation beyond what is presented in the picture.

When interpreting even the most straightforward and simple photographs on the basis of internal context alone, a working knowledge of codes is presumed. We are indebted to Gombrich (1960) and Goodman (1976) on this count, particularly because they remind us that we have become so inured to invented codes and systems of representations operant

within our culture that we are likely to have internalized these to the extent that pictures seem to be natural rather than conventional.

Titles ought to be considered part of the photograph's internal context, part of what is given by the photographer with the photograph, if not in the photograph. The importance of considering titles has been recently given new impetus by Arthur Danto (1981). They often, but not always, give us clues as to what the photographer may have meant us to attend to, what he or she may have had in mind in making the picture: "A title is a direction for interpretation" (p. 119). Even to give a photograph a label of "untitled" is, in modern conventions, to indicate that it is to be considered an artwork. To be consistent, captions given by the photographer ought also be considered part of the picture's internal context. However, in practice it is sometimes hard to determine if the caption has been provided by the photographer or by an author or editor. There is no difficulty in placing texts in internal contexts for several works: Duane Michals often writes on the surface of his photographs, and photographers making books often provide text and identify it as their own. When the authorship of texts is unidentified, it is interpretively safer to assume that they are part of the work's "external context." Not to do so in some cases, as with the various texts accompanying Doisneau's photograph of the Paris bar, for example, would be interpretively wrong.

Information drawn from a photograph's "original context" usually contributes to at least a richer understanding of the picture. Some photographs, however, are dependent on original contextual information for understanding. Several engaging in what has been termed "post-modernism" have been re-photographing other photographers' work and exhibiting it as their own. Sherrie Levine has copied and exhibited pictures of Walker Evans' under the title of "After Walker Evans." Another group of Levine's photographs, "Troubles in Paradise," are copies of Mondrian's paintings. Richard Prince is exhibiting his copies of photographic magazine advertisements. For an understanding which falls within a range of interpretive tolerability for any one group of these photographs, one needs information beyond that which appears in the pictures. Levine's copies of Evans' pictures would be very misleading to a viewer who was ignorant of some history of photography. Even if one knew of the stature of Walker Evans one would also need to have a good knowledge of his specific photographs, of which there are thousands, to realize that these are not recent pictures of southern share-croppers photographed in the manner of Evans, but are actually copies of his pictures. To intelligently engage Levine's or Prince's exhibitions, one would need to know about Evans and Mondrian and their work, and some of the tenets of modernism which this work is meant to criticize and challenge. Gazing long and hard at the photographs would reveal none of this.

Because of the relative ease and quickness of photography compared to other visually expressive forms, mature photographers have usually made considerably more pictures than mature painters or sculptors. For this reason it is interpretively wise to be aware of

the corpus of a photographer's work in interpreting one photograph. Consideration of "original context" might also profitably involve consideration of the picture makers' visual, social, and philosophical influences. In our times of rapid communication such information is often readily available and ought not be ignored. Biographical and psychological information, including intent, may be useful for one who is attempting to gain an understanding and appreciation of the work in question. The interpretor ought to develop the discretion to sort the irrelevant from the relevant concerning contextual information of these sorts in deciding what the work in question is about.

The various uses put to the Doisneau photograph have already provided examples of five different "external contexts" which considerably altered how the photograph was to be interpreted. External contexts are forms of interpretation which need to be evaluated. They can be evaluated by comparing one to the others, and one to internal and original sources of contextual information. The external contexts or presentational environments a photograph has been put to accumulate over the years and eventually are a source of varied points of view about a photograph. These different points of view can offer enlightenment about a photograph and ought to be considered and evaluated in reaching an interpretive conclusion about a photograph.

Although one's understanding of any picture or sculpture would benefit from such interpretive scrutiny, contextual investigations of photographs are particularly important because of the nature of photography. Because photographs are segments excised from large real-world contexts, one ought to attempt to replace the segment as pictured back into the whole for several reasons. One needs to do this to understand what the photographer has done to the original situation by his or her excision in order to posit what the photograph is about. An understanding of the differences between the picture and the reality from which it was made is essential to understanding the photograph. Without these distinctions considered, the photographer drops out and the photograph becomes transparent and the viewer is left mistakenly considering the photograph as a real-world object or event rather than considering it as a photographer's picture. Similarly, appreciation of photographs is often dependent on recognizing and understanding the transformations the photographer has made in excising the segment so as to make it aesthetically noteworthy rather than routine or mundane. The viewer who wants to understand and appreciate the photograph needs to see what fresh and significant relationships the photographer may have brought about, and the means selected to make them manifest.

Our cultural tendency, however, is to see photographs as mirrors, or windows, or the way it was, or as mere mechanical transcriptions unencumbered by knowledge and values. To miss the differences between the photograph and the object or event photographed is to miss whatever contribution to knowledge and experience the photograph may contain.

Because photographs are also segments of time excised from a temporal flow, one is wont to reconstruct, at least imaginatively, the moments before and after that which is shown, much as if one were seeing one frame from a feature length movie. Just because photographs

have a halo of credibility surrounding them one ought to investigate whether belief is deserved. Because they seem transparent one ought to investigate what the photographer, or the editor, or the curator, has invested, covertly or overtly, in the image and through the placement of the image for viewing, rather than to naively accept a photograph as the way it was. Considering contexts allows this.

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The Inventory of Dramatic Behavior Adapted for Group Observation Extending the Research Potential for Drama Education

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In the past, the field of drama education has been known as a practically-oriented field whose small numbers of researchers concerned themselves with studies of an historical or descriptive nature. Recently, however, rapid expansion has taken place in the numbers of empirical research projects. More and more questions are being formulated which require reliable, validated instruments as part of the research design. Unfortunately, these projects are delayed or weakened because of a lack of these instruments. Essential questions concerning optimum drama approaches, techniques for particular groups, behavioral expectations, and even the kinds of drama elicited by various types of approaches have to be considered. An instrument was needed which could assist researchers in looking at various components within drama itself. In answer to this need, a research team at Rutgers University modified the existing but unwieldly Inventory of Dramatic Behavior (IDB) and conducted reliability and validity measures on this new instrument.

The Inventory of Dramatic Behavior Adapted for Group Observation (IDBG) was designed to assess several dimensions of the dramatic quality of improvisational drama of groups of school-aged children (Rosenberg, Pinciotti, and Smith, 1983). The IDBG is a modification of the Invencory of Dramatic Behavior developed by Lazier, Sutton-Smith, Karioth, and Zahn (1972) which was intended to measure individual children. The instrument was developed for use in evaluating drama instruction and to provide a method for capturing aspects of creative drama which would be generalizable across studies in the expanding field of drama and theatre research.

Since the essence of drama is often thought to be its ephemeral nature, an instrument designed to capture aspects of drama must be shown to be reliable over time in the absence of an intervention. Thus, test-retest reliability is critical. Secondly, it must be demonstrated that the instrument is capturing the aspects of drama which are of interest to researchers and practitioners. The purpose of the present study was two-fold: first, test-retest reliability would be established and, second, data reflecting on the construct validity of the instrument would be gathered. Two validity studies were conducted. In the first, 10 groups of students without prior drama training were compared to 10 groups who had received training. In the second, 18 groups of students were tested before and after a 10-week program in creative drama.

Method

Description of Inventory

The IDBG is designed to be used with from 9 to 16 children and from 3 to 4 trained observers. A grid 20' x 15' is taped onto the floor (each section is 5' x 5') of the playing area for the observation. Subjects are given instructions concerning a setting in which they will be placed without props or scenery and are asked to improvise, without dialogue, who they might be and what they might be doing in this particular scene. The group is shown the location of various imaginary objects in the setting. They are instructed to work until they are finished or reach a ten-minute time limit. Each group is given three improvisations, from a "bank" of six, to perform. Subjects may move anywhere within the grid, but may not leave the grid unless they wish to discontinue participation in the improvisation.

A team of four trained raters are positioned outside the grid area. Each rater is assigned 3 to 4 subjects to observe throughout the observation session. A time sampling procedure insures equal input from the various subjects in the group. The raters observe and record the following behaviors:

1. Dramatic incidents: An integral scenic unit in which the motivational pattern remains unchanged.

2. Dramatic acts: Smallest unit of behavior within each incident.

3. Repeated acts: Measure of those acts immediately repeated.

4. Squares traversed: The number of spatial units traversed by each subject in the course of each observation period.

5. Characters created: The number of imaginary characters personified by each child during the course of each observation period.

6. Interaction: The number of times the participant begins an interaction with another participant.

The total time is also recorded for each improvisation. These behaviors are summed over subjects and improvisations and averages (per improvisation per subject) are calculated.

Subjects

There are three analyses to be presented here and the samples are slightly different; thus, it will be necessary to describe all three. All groups, however, shared the following characteristics: (a) Students were between the ages of 10 to 15; (b) Students were observed in groups of 12 to 16; (c) Students were observed in their schools, not in extracurricular drama classes; (d) The unit of analysis is the group, not the individual student (scores were aggregated to the group level); and (e) Students came from middle-class, predominantly white schools. For the test-retest reliability, 18 groups of students were observed. Groups

were re-tested 2 to 3 days following the initial testing. For the "known-groups" validity study, 10 groups of subjects who had received 6 to 10 weeks of drama training were compared to 10 groups which had received no training. For the third study, 18 groups were tested before and after participating in a 10-week creative drama program.

Results

Means, standard deviations, and reliabilities for the test-retest reliability study are presented in Table 1. Reliabilities range from .753 to .887, indicating that there are, in fact, aspects of creative drama which are relatively stable. The means and standard deviations are also fairly consistent over the two administrations.

Differences between trained and untrained subjects are presented in Table 2. All differences are highly significant, with trained group mean levels being at least two standard deviations higher than for untrained groups on all scores. Standard deviations for trained groups are also larger than for untrained groups. This is probably due to a fan-spread phenomenon.

Table 3 presents means, standard deviations and t-test (dependent samples) for the group which was tested before and after drama training. Significant gains are made on all scores except for Repeated Acts and Squares Traversed.

Discussion

The results suggest that if creative drama is ephemeral, there are at least aspects of it which are not. The reliability data indicate that the variables are measured consistently over a short time interval. More important than stability, however, is the issue of whether anything of value is being measured. The underlying assumption of both validity studies was that creative drama training would improve those aspects of drama which are important (to drama leaders, at least). If the IDBG is capturing those aspects, or reflections of them, then differences due to training will be observed. Clearly, the results indicate that this was the case. It should be noted that for the variables of Squares Traversed and Repeated Acts, an optimal level can be reached above which an incerase is not desirable. Random running about the "stage" and robot-like repetition of behavior can increase these variables beyond a desirable level. For the remaining variables, however, more is typically better.

The potential for the IDBG is not limited to research in drama or theatre-related activities. The ability to be physically expressive and to communicate in a non-verbal fashion are goals of educational activities in a variety of domains. The IDBG may be useful in research and evaluation in such activities as well.

Table 1
Reliabilities, Means and Standard Deviations
of IDBG Total Score and Subscore (n=18)

Score	First Administration M	First Administration SD	Second Administration M	Second Administration SD	Test/Retest Reliability
Total score	90.34	52.60	87.03	61.80	.873
Dramatic Acts	35.24	21.55	35.64	25.85	.887
Dramatic Incidents	7.96	3.67	7.33	4.60	.869
Repeated Acts	20.98	14.05	19.08	15.20	.785
Characters Created	1.09	1.05	1.52	1.63	.816
Character Interaction	5.86	3.94	6.43	5.38	.753
Squares Traversed	19.20	10.68	17.03	10.43	.817

Table 2
Differences Between Trained and Untrained Students (n=20)

Score	Untrained M	Untrained SD	Trained M	Trained SD	t	P
Total	51.41	25.01	137.01	36.15	+6.16	.001
Dramatic Acts	18.15	9.72	50.94	16.91	+5.31	.001
Dramatic Incidents	5.19	2.47	11.09	2.68	+5.83	.001
Repeated Acts	12.24	6.89	33.46	10.57	+5.32	.001
Characters Created	0.54	0.36	2.18	1.42	+3.57	.001
Character Interaction	3.01	1.87	9.73	2.86	+6.22	.001
Squares Traversed	12.30	5.66	28.86	9.56	+4.72	.001

Table 3
IDBG Scores Before and After Training (n=18)

Score	Before M	Before SD	After M	After SD	t	P*
Total	82.61	43.79	105.47	52.22	3.62	.002
Dramatic Acts	25.72	14.44	42.93	21.99	5.60	.001
Dramatic Incidents	8.54	4.83	10.04	5.35	2.26	.037
Repeated Acts	21.79	12.28	17.76	10.65	-1.90	
Characters Created	1.33	1.56	3.77	3.41	3.31	.004
Character Interaction	5.34	3.56	8.11	4.89	3.63	.002
Squares Traversed	19.91	10.80	22.80	13.25	1.58	.133

*Dependent Samples

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Differences Among Ability Groups in Participation in the Performing Arts at the High School Level

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In an attempt to provide for the needs of all students and to assist students in all areas of development, the high school curricula includes instruction and activities in the performing arts. The importance of the arts is exemplified by The College Board's (1983) inclusion of the arts as a basic academic subject in which students preparing to go to college need knowledge and skills. Although students of all ranges of academic ability may participate, it would seem likely that students of higher intellectual ability participate more frequently than do students of either average or low ability.

Studies of the characteristics of gifted and talented students indicate that such students have a wide diversity of interests and great versatility (Newland, 1976). They also possess a high degree of emotional awareness and an unusual emotional depth and intensity (Clark, 1979). Such characteristics support the contention that high ability students may be more interested in participating in the performing arts.

In addition, it appears reasonable to expect that students are more likely to participate in the performing arts if they demonstrate a talent in the area. Recent definitions of "giftedness" indicate that individuals may demonstrate a talent or gift in more than one area (Marland, 1972) such as in general intellectual ability and in the performing arts. Although there are notable studies of the relationship between creativity and intelligence (Torrance, 1962; Getzels & Jackson, 1962), little attention has been given to the relationship between the performing arts and academic ability.

Clements, Dwinell, Torrance, and Kidd (1983) found that high school students who had intense and prolonged dramatic experiences had higher creativity test scores than less experienced counterparts. Moreover, the students who participated in the study as members of a teen drama program were better than average students in school and half of the students qualified for their high school gifted program.

A study by Knieter and Newman (1982) investigated the relationship between interest in music and a propensity for playing music and academic achievement. Their study found a significant relationship among grades, amount of education and occupational prestige, and the student's music propensity score.

The present study sought to examine the relationships between academic ability and participation in the performing arts at the high school level. The research questions were as follows:

1. Is ability level significantly related to participation in the performing arts?

2. Are selected demographic variables significantly related to participation in the performing arts.

3. Is the ability level significantly related to participation in the performing arts when the variability due to demographic variables is held constant?

4. Are the answers to the first three questions the same for males and females?

5. Are there different rates of participation in the performing arts for males and females?

Method

Data Base

Data reported in the present study came from a survey known as High School and Beyond (HSB) that was conducted by the National Opinion Research Center in 1980. This large data base is a rich source of information that allows for analyses of questions involving youth and education. Data are available for 28,240 sophomores and 30,030 seniors on 638 variables from 1,015 public and private schools across the United States. A detailed description of the sample, sampling procedures, and tests can be found in other sources (Coleman, Hoffer, & Kilgore, 1982; NCES, 1982). Of the senior students that comprise the HSB data base, 21,479 were used for the present study. The 8,551 seniors not included had missing data for one or more of the variables incorporated in this investigation. Sophomores were not examined in this study.

Performing Arts Variables

The three questions that were used to obtain information were part of a larger survey that was administered to all the students in the HSB sample. The students responded to the following general question: "Have you participated in any of the following types of activities either in or out of school this year?" Three of the activities listed were, (1) debating or drama, (2) band or orchestra, and (3) chorus or dance. The students chose one of the following responses for each activity, (1) have not participated, (2) have participated actively (but not as a leader or officer), or (3) have participated as a leader or officer. For the purposes of the present study, choices 2 and 3 were combined to form a dichotomy of those who did participate in the activity vs. those who did not participate.

Ability

The measure of ability used in the present study was really a combination of achievement tests and nonverbal ability tests. The term "ability" was used to describe the composite measure despite the fact that it was a combination of both achievement and ability tests. One could argue that "ability" is not the best descriptor, however, the purpose of combining both types of tests was to get a general measure

of overall functioning. There were nine tests used to arrive at a general measure of overall functioning. The tests were, senior vocabulary parts 1 and 2, reading comprehension, math parts 1 and 2, mosaics parts 1 and 2, picture-number, and visualization in three dimensions. The vocabulary sections required the selection of a synonym for the target word from a list of 5 words. In the reading comprehension section, the task was to read short passages (approximately 140 words per passage) and then answer several multiple-choice questions about information stated ir implied in the passage. The math sections required knowledge of arithmetic and basic algebra. The task of the mosiac tests was to determine the location where two complex visual patterns differed. The picture-number test was basically a short-term memory task in which pictures of common objects were paired with two-digit numbers. After the student studied the pairings, they were then presented with only the common object and required to identify the correct numerical partner. Finally, visualization in three dimensions presented the subject with a drawing of a flat piece of paper on the left. To the right were five objects, only one of which would be made by folding the flat piece of paper along its dotted lines. The subject's task was to visualize how the flat piece of paper would look when it was folded, and then select the finished object from the five choices. A further description of the tests can be found in an article by Page and Keith (1981).

The nine tests were submitted to a common factor analysis with varimax rotation and squared multiple correlations in the diagonal. The rotated factor loadings produced two factors. Factor scores were generated for every subject on each of the two factors. These two factor scores were used as the general ability measure.

Demographic Variables

Region. The region of the country that a student came from was used to assess influences on reading achievement. There were nine regions of the country identified: New England, maddle Atlantic, south Atlantic, east south central, west south central, east north central, west north central, mountain, and Pacific. The students in each region were sampled appropriately according to their proportion to all students in the country. For the purpose of the analyses, each region was coded as a separate categorical variable with a 1 indicating membership in the region and a 0 otherwise.

School type. The next demographic variable was the type of school in which the student was enrolled. The nine school types were, regular public, alternative schools, Cuban Hispanic public, other Hispanic public, regular Catholic, Black Catholic, Cuban Hispanic Catholic, elite private, and other private schools. As with region, each school type was coded as a separate categorical variable with 1 indicating enrollment in a particular school and 0 otherwise.

Socioeconomic status. The SES was a composite variable obtained by summing five standardized variables: father's occupation, father's education, mother's education, family income, and number of possessions (daily newspaper, encyclopedia, typewriter, electric

dishwasher, 2 or more cars, more than 50 books, student's own room at home, and pocket calculator).

Analyses

Differences in rates of participation in the performing arts for males and females were presented by cross-tabulation analyses. Multiple regression procedures were used in determining the relationships of ability and the demographic variables when predicting participation. First, ability (factor scores on the two factors) was examined in order to determine its efficiency in predicting participation in the performing arts. Second, the demographic variables of region, school type, and SES were tested to determine the amount of variance they could account for in participation. Third, the demographic variables were held constant in order to ascertain how much variability in participation would be accounted for by ability over and above the variability due to the demographic variables. The analyses were done for the total group and separately for males and females.

The emphasis in the interpretation of the results for the present study is on the amount of variance accounted for in predicting participation in the performing arts. This approach was adopted since almost every very small difference was statistically significant due to the large sample size. Therefore, from the standpoint of making the interpretation of the results more meaningful, it is recommended that an R^2 exceed .02 (small effect size) in order to be considered as having any potential practical significance.

Results

The results of the cross-tabulation analyses are reported in Tables 1, 2, and 3. Table 1 gives the breakdown of participation in debate or drama by gender. The results of this analysis revealed that approximately 85% of the students did not participate in debate or drama. The relationship between gender and participation in debate or drama was $\phi = .06$. This weak relationship demonstrated that males and females had similar rates of participation in debate or drama. Roughly 13% of the males participated in either of these activities while 17% of the females did so.

Table 2 displays the breakdown of participation in band or orchestra by gender. The finding of this cross-tabulation demonstrated that approximately 86% of the students did not participate in band or orchestra. The relationship between gender and participation was $\phi = .02$. Once again, this weak relationship revealed that males and females had very similar rates of participation in band or orchestra. Approximately 14% of the males participated in either activity while 15% of the females participated.

Table 3 presents the cross-tabulation of participation in dance or chorus by gender. The results of this analysis revealed that 79% of the students did not participate in dance or chorus. The relationship between gender and participation was $\phi = .20$. This was a low moderate

Table 1
Crosstabulation of Gender by Participation in Debate or Drama

Frequency Row Percent Column Percent	Debate or Drama No	Yes	
Male	8894 87.42 48.58	1280 12.58 40.37	10174 47.37
Female	9413 83.26 51.42	1892 16.74 59.65	11305 52.63
Total Percent	18307 85.23	3172 14.77	21479

Note. r = phi = .058
R^2 = .0034

Table 2
Crosstabulation of Gender by Participation in Band or Orchestra

Frequency Row Percent Column Percent	Band or Orchestra No	Yes	
Male	8769 86.19 47.73	1405 13.81 45.22	10174 47.37
Female	9603 84.94 52.27	1702 15.06 54.78	11305 52.63
Total Percent	18372 85.53	3107 14.47	21479

Note. r = phi = .018
R^2 = .0003

relationship and indicated that females tended to participate in these activities more than males. About 12% of the males participated in either dance or chorus while 29% of the females participated.

The results of the multiple regression analyses reported in Table 4 indicated that ability demonstrated only a very low relationship to participation in debate or drama for the total group (R^2 = .021), for males (R^2 = .025), and for females (R^2 = .022). The relationships between ability and participation in band or orchestra, or dance or chorus, were for all practical purposes insignificant. Ability did not account for even 1% of the variability in participation for any of the groups.

The demographic variables of region, school type, and SES accounted for only very small amounts of variance in participation in the performing arts. For the total group, the demographic variables accounted for about 1% of the variability in participation in debate or drama. For males, the demographic variables accounted for almost 2% of the variability in debate or drama. For females, the demographic variables account for almost 2% of the variability in participation in band or orchestra. In the other performing arts activities for all groups, the demographic variables were able to account for less than 1% of the variability in whether or not students participated.

The preceding analyses indicated that ability was able to account for approximately 2% of the variance in participation in debate or drama across all three groups. The results in Table 4 show that when the demographic variables were held constant, ability still accounted for close to 2% of the variance in participation in debate or drama.

Discussion

In terms of the number of males and females that participated in performing acts activities in high school, the HSB data for seniors indicated that more females participated in chorus or dance than males (29% vs. 12%). In addition, there was a slight tendency for females to be involved in debate or drama more often than males (17% vs. 13%). There appeared to be little difference in the participation in band or orchestra for females and males (15% vs. 14%).

The overall measure of ability demonstrated a low relationship to participation in debate or drama for both males and females and the total group. This result suggests that students with higher ability levels tended to be involved with debate or drama more than lower ability students. This finding seems to be consistent with the verbal demands of debate and drama. These tasks typically require extensive use of abilities such as verbal reasoning, logical thinking, and verbal memory. The large verbal component in these activities would tend to enhance their relationship to and dependency on the overall ability level that was assessed through paper and pencil tasks. In subsequent analyses where demographic characteristics were held constant, the overall measure of ability was still related to participation in debate or drama. This finding suggests that regardless of the school type, region, or SES, higher ability students tended to participate in debate or drama more often than students with lower abilities.

Table 3
Crosstabulation of Gender by Participation in Chorus or Dance

Frequency Row Percent Column Percent	Chorus or Dance No	 Yes	
Male	8911 87.59 52.65	1263 12.41 27.73	10174 47.37
Female	8014 70.89 47.35	3291 29.11 72.27	11305 52.63
Total Percent	16925 78.80	4554 21.20	21479

Note. r = phi = .204
R^2 = .0416

Table 4
R^2s for Predicting Participation in the Performing Arts from Ability and Selected Demographic Characteristics

	Ability	Ability and Demographics	Difference[1]	Demographics Only
	1	2	3	4
Total Group				
Debate or Drama	.0209	.0275	.0171	.0104
Band or Orchestra	.0066	.0179	.0091	.0088
Chorus or Dance	.0006	.0060	.0007	.0053
Males				
Debate or Drama	.0247	.0366	.0185	.0181
Band or Orchestra	.0064	.0137	.0096	.0041
Chorus or Dance	.0005	.0080	.0003	.0077
Females				
Debate or Drama	.0224	.0281	.0198	.0083
Band or Orchestra	.0075	.0269	.0089	.0180
Chorus or Dance	.0001	.0069	.0001	.0068

Note. [1]Table entry in this column is the squared semi-partial correlation derived from the R^2 in column 2 minus the R^2 in column r. The squared semi-partial correlation represents the amount of variance attributed to ability independent of the effect of the demographic characteristics.

The relationship of the demographic variables to participation in the performing arts for the total group was very low to almost non-existent. This was a rather surprising finding and suggested that school type, region, and SES exerted little influence on the levels of participation in performing arts activities. For males, there was a low relationship between participation in debate or drama and the demographic variables. For females, there was a low relationship between participation in band or orchestra and the demographic variables. While these relationships were statistically significant due to the large sample, they were very low. However, the findings did indicate that there was a low but consistent tendency for the demographic variables to be related to participation in debate or drama for males and participation in band or orchestra for females. The purpose of the present study did not include attempting to untangle the influences of the separate demographic variables in predicting participation in performing arts activities.

In conclusion, the overall measure of ability demonstrated a weak relationship to participation in debate or drama. Although the finding suggested that there was a statistically significant and consistent relationship between ability and participation in debate or drama, the low magnitude of the relationship indicated that ability played only a small role in determining participation; thus, many other factors are involved. The demographic variables of school type, region, and SES, however, did not appear to be important factors in determining participation in performing arts activities.

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The Application of Questioning Strategy Research to Art Criticism Instruction

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The purpose of this paper is to review selected research findings on questioning strategies and models of instruction as these might relate and apply to art criticism instruction. Increasingly, art educators are proposing that, in addition to studio production, art instruction include experiences in the critical analysis and evaluation of art. In practice, however, artistic insights are still primarily confined to the art production process, and the "discussions of works have usually proved unfocused, brief and idiosyncratic rather than comprehensive in the features highlighted" (Perkins, 1977, p. 301). In this paper, it will be proposed that questioning strategy and related research reveals findings crucial to the implementation of art criticism instruction.

Research Methodology

The research methdology for this paper has consisted of reviewing studies on classroom questions in order to ascertain areas of similarity and hence application between questioning strategies and art criticism. In addition to manual searches of general education and art education literature, the ERIC data base was computer searched.

Information was reviewed in the three following general areas: (1) descriptive studies of classroom questions; (2) the structure and use of various educational models, such as teaching behavior inventories, question-answer observational inventories, and taxonomies of learning behaviors; and (3) the characteristics of art criticism formats and suggested methodologies for art criticism instruction. Through the research methodology of conceptual analysis and evaluation, the findings in each of these areas were reviewed for possible similarities and instructional applications. The remainder of this paper will consist of a research review and discussion that correlates information on questioning strategy research, educational models, and art criticism instruction. It will be posited that research data and proposals in these three seemingly diverse areas reveal significant conceptual overlap and characteristic similarities as well as a concern for similar educational goals and objectives.

Descriptive Data on Classroom Questions

A wealth of data indicates that the type of questions posed in a classroom and the responses given not only dictate what is being taught and subsequently learned, but that there is an equivalency between the two. Moore (1973) finds that comments made by art students are influenced by the types of questions they are asked. Simply put, research "indicates that asking questions at levels above memory is an effective method for getting students to operate at cognitive levels above memory" (Atwood & Stevens, 1976, p. 253). Moreover, a questioning dialogue

between teacher and students has been correlated with student participation and motivation inasmuch as students become actively involved in the construction of meaningful content and outcomes. The posing of higher cognitive level questions allows students to discover information and formulate meaning rather than being solely dependent upon predefined knowledge (Armstrong & Armstrong, 1977; Arnold, Atwood, & Rogers, 1973; Atwood & Stevens, 1976; Lucking, 1975; Sisk, 1976b).

Although virtually every set of educational guidelines includes the goals of critical thinking and student involvement, the majority of classroom questions are focused on the less complex cognitive processes of memory-recall and comprehension, such as paraphrasing previously learned information (Newton, 1978). Nearly a century of research thoroughly documents both the high frequency of questions in the classroom and the almost total lack of questions posed that require critical and evaluative thinking. In 1893, Rice recorded a heavy reliance upon recitation, and in the often-cited 1912 study conducted by Stevens, in which questions were recorded in 100 high school classrooms, it was found that teachers asked a mean of 395 questions per day, with two-thirds of those questions requiring factual recall (Gall, 1970; Morse & Davis, 1970). Subsequent studies of questions in the classroom for all grade levels and all subject areas, reveal essentially the same set of grim statistics as to the high frequency of questions and the high percentage of knowledge questions and rote responses (Beittel & Clements, 1964; Davis & Tinsey, 1967; Gallagher, 1965).

In 1936, Haynes found 77% of the questions in a sixth grade history class to require memory-recall responses (Lucking, 1975). Corey (1940) found 71% of the questions to be factual in a high school science class. In a study of questions posed by student teachers in elementary science and social studies classes, Arnold, et al., (1973) recorded 61% memory level questions with most of the remaining 39% asking for comprehension responses. When this study was replicated on the secondary level with student teachers in science, 70% were memory level questions, with the remaining 30% being comprehension and application questions (Atwood & Stevens, 1976). As in the first study, those levels of questioning usually designated as involving more complex cognitive processes, such as analysis and evaluation, were found to be absent. Both Gall (1970) and Blosser (1975) conclude that perhaps 60% of all classroom questions require memory-recall responses, 20% are procedural, and an optimistic 20% actually require students to employ critical and analytical thinking processes.

Consistent with the lack of questions requiring higher level thinking processes, it has been found that teachers often pose questions at a rapid rate, with the average pause time between a question and a response and between a response and another question approximately 1 second each (Atwood & Stevens, 1976). This rapid succession of questions requiring short, memory-based responses that can be clearly declared as correct or incorrect is such a recognizable classroom phenomenon that it has been labeled as the "bombing rate" by Sadker and Sadker (1977, pp. 185-186).

Researchers such as Arnold, et al., (1973) note that although the topics studied in most classrooms should lend themselves to the development of higher level inquiry learning, this goal is not achieved through the current manner in which questions are currently used. The problem is not that teachers do not ask enough questions, but rather that they ask too many questions of the wrong kind. Despite the current dismal realities of classroom questioning methodologies, many researchers still agree that teacher-student dialogues remain the most viable instructional vehicle for critical and analytical learning.

Prescriptive Data on Questioning Strategies

From an extensive review of studies, Gall (1970) was prompted to declare that there is more than enough descriptive data on teachers' classroom questions and on what should not be done. What is needed are more prescriptive studies and analyses of previous studies for clues as to how to implement effective questioning strategies. For this paper, studies were reviewed for suggestions on how questions can be properly phrased and presented.

Student achievement has been found to be correlated positively with a systematic approach to the subject matter, wherein questions are included that deal with memory-based as well as complex thinking processes (Lucking, 1975). For example, Bloom's taxonomy provides categories of learning that allow for the development of higher, more complex levels of thinking by having instruction proceed through the cognitive levels of knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Gagne's (1965) developmental learning model provides the categories of memory, convergent thinking, divergent thinking, and evaluation. Although Bloom's taxonomy or other models of learning provide a convenient format for sequencing questions, their application and value needs to be qualified. A taxonomy provides a general structure for instruction and a focus toward the development of questions beyond memory-recall rather than possessing any inherent relationship to the structure of thinking processes, per se. It also should be noted that students need to be asked probing and elaborative questions that develop their initial responses and that go well beyond any strict sequencing of questions in taxonomic categories (Gall, 1970; Hamblen, 1984; Hamblen, in press).

The instructional value of higher level questions, let alone the conscious structuring of those questions, is often not apparent in classroom practice unless teachers have received questioning strategy training. In separate studies, it has been found that teachers who have received training in an instructional model, such as Bloom's taxonomy, and in the formal construction of higher level questions, ask significantly more higher inquiry level questions. Trained teachers were found to be less dependent on lecture methodologies, they received higher level responses to their questions, and they were less judgmental of student responses. Without training in the formal characteristics of question construction, teachers interrupted students, repeated their own questions, answered their own questions, used leading questions, repeated students' answers, and failed to allow adequate pause

time (Farley & Clegg, 1969; Nasca & Davis, 1982; Newton, 1978).

Further prescriptive data on questioning strategies suggest that most high level cognitive questions are asked, not in one-to-one situations, but in small group interactions (Nasca & Davis, 1982; Sisk, 1976 b). The use of primary materials, such as actual objects or places and persons that allow for direct experiences, also tends to prompt more high level questions (Gall, 1970). Finally, researchers have found that two-thirds of the questions in a classroom are asked by the teacher, with the remaining one-third, often procedural in nature, asked by students (The Art of Questioning, 1967). The quality of instruction in a classroom is indicated not only by the types of answers given by students, but also by the types of questions students ask. The fact that this is a neglected area of study may be due to the scarcity of available, observable behaviors, i.e., students ask, on the average, one instructionally related question per month (Sadker & Sadker, 1977).

Questioning Inventories and Learning Taxonomies

The essential key toward an effective questioning methodology is the use of higher cognitive level questions. Simply put, if such questions are not asked, all other questioning strategy suggestions for improving the learning environment are of little consequence. Moreover, the asking of higher level questions is inextricably related to the development of a method or procedure that incorporates critical and analytical thinking.

Davis, Morse, Rogers, and Tinsley (1969) date educators' concerted interest in questioning strategies to the 1950's and 1960's when there was an emphasis on inquiry methods of instruction and discovery learning. Not surprisingly, one can also date the development of many questioning inventories and models of learning to these same decades. In 1970, Gall found eleven major systems for classifying teachers' questions; in 1976, Riegle found twenty-one inventory systems that were either subject specific or had cross-subject application.

Most questioning inventories allot equal value to all types of questions and do not prescribe an instructional methodology. They are essentially descriptive tools used for the classification of questions that teachers do ask rather than necessarily those questions teachers should ask. Some inventories, however, may provide categories for the development of instructional questions. From Parson's inventory categories of rhetorical, information, leading, synthesizing, and other, Armstrong and Armstrong (1977) selected and developed the information category for descriptive questions, the leading category for questions that develop sorting abilities, and the synthesizing category for analytical and generalization responses. Likewise, Sisk (1976 a) bases a question model on the four interrogative question modes of Stahl and Casteel: empirical, relational, valuing, and feeling.

Question inventories attempt to account for the variety of questions that occur in a classroom. Models of learning behaviors are less descriptive of the types of questions that actually occur in the

classroom, however, they are more easily adapted to instructional strategies. As proposed descriptions of the processes and manner in which learning occurs, models of learning provide both categories for question development as well as a recommended sequence for instruction.

In Guilford's Structure of the Intellect (SOI) model, the operations dimension includes cognition, memory, convergent production, divergent production, and evaluation (Sorensen & Addison, 1977). Gagne's (1965) stages of learning involve the identification of attributes (discrimination), the relationship of attributes (conceptualization), and the combining of attributes (formulation of a higher order). In a similar manner, Bloom's taxonomy suggests that learning proceeds in a more or less hierarchical manner that starts with factual knowledge and proceeds through comprehension, application, analysis, synthesis, and evaluation (Bloom, et al., 1956).

Many taxonomies of learning behaviors may be faulted for a rigidity of structure, for the fallacious assumption that learning occurs in a linear fashion, and for separating learning into categories. The value of such models, however, lies in their emphasis on the development of complex thinking skills and on the active involvement of students (Farley & Clegg, 1969; Lucking, 1975; Zevin, 1976).

Essentially, models of learning deal with thinking processes and what should be taught, not with teaching methodologies, per se. It was not until the 1960's that taxonomies, such as Bloom's, began to serve as formats for instructional questions. Sanders (1966) and others, such as Clegg, Manson, Ochoa, Nichols, and Williams (1968) and Sadker and Sadker (1977), showed how questions, conforming to the sequence and thinking processes outlined in a taxonomy, could develop the educational goals of student involvement, discovery learning, and critical thinking skills.

Two related issues become apparent in implementing art criticism instruction: (1) the goals of achieving analytical and evaluative skills in art, and (2) the means to achieve those goals. In this paper it is proposed that questions asked within the categories of a learning taxonomy represent a synthesis of the goals of critical and evaluative thinking and the means to achieve those goals, i.e., a questioning strategy within a structured format provides the methodology for achieving art critical skills.

Applications to Art Criticism

Sanders (1966) broadly defines questions as problem or projects that call forth student responses. In a highly similar vein, Feldman (1981) describes art criticism as a performance, and Smith (1973) describes it as an exploratory process. This author believes that a variety of auspicious congruences occur among the findings, structures, and goals of learning models, questioning strategy research, and art criticism instruction.

The efficacy of both sequential instruction and teacher-student dialogues is well-recognized and has been extensively discussed in art education literature. Most art criticism formats allow for some type of description, analysis, and interpretation, with the critical act terminated by an evaluation or judgment (Chapman, 1978; Feldman, 1981; Johansen, 1982; Mittler, 1982). In other words, the art criticism format requires ever-increasing complex levels of thinking that closely parallel the categories of many learning models. In general education it is found that if a teacher's questions do not follow some sequence, student responses decline in frequency and length and in complexity of thought (Zevin, 1976). For art criticism, Clements (1979) likewise emphasizes the necessity to move toward levels beyond mere description. "The task for art criticism methodology will be to focus not on the common and mundane, but on the more highly developed abilities required" (p. 70). The art criticism format itself represents a recognition of the need for some form of structured instruction that leads the student toward higher cognitive levels.

Many art educators strongly advocate an art criticism dialogue between teacher and students (Taunton, 1983). Art criticism has been described as an exploratory or problem-solving activity wherein there is an active involvement of the student in the construction of meaning and evaluation (Smith, 1973). Feldman (1973) suggests the use of the Socratic method for art criticism dialogues; Johansen (1982) advocates an interactive mode within the categories of impression (description), expression (interpretation), and commitment (evaluation). Art dialogue has a respectable history in art education, dating from the 1950's when it was believed that children's verbalizations improved their graphic symbolizations (Armstrong & Armstrong, 1977; Clements, 1964). This focus on conversations revolving around art production can be easily transferred and adapted to art criticism instruction involving the use of questions.

Summary and Conclusions

The review of classroom questions, learning models, and art criticism instruction reveals significant congruences among goals, structures, and instructional methodologies. Classroom questions, when properly sequenced and constructed, have been correlated with discovery learning, student involvement, and the development of higher cognitive skills. Learning models describe thinking processes, emphasize the educational goal of developing complex levels of thinking, and provide a framework for sequential instruction. Art criticism provides a structure whereby students explore the meanings of a given art object through the processes of analysis and evaluation.

To summarize, art criticism offers a propitious opportunity for the implementation of instruction that can guide aesthetic perceptions, allow for an exploration of artistic meanings, and develop analytical and evaluative skills. This author believes that research data on classroom questions and the literature on learning models provide information helpful toward achieving those art criticism goals.

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The Research and Development Function of the 1983 Getty Institute for Educators on the Visual Arts

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The purpose of the Getty Center for Education in the Arts,[1] an operating unit of The J. Paul Getty Trust, is to research and develop arts education programs (Duke, 1983). The Getty Institute for Educators on the Visual Arts[2] is one of several Center projects; it explores introducing discipline-based art programs into elementary schools.

The Institute is a grand experiment because it uses careful, systematic scrutiny and analysis of its own procedures in order to achieve sustained prograss (Kidd, 1983). The Getty Institute has five components: a theoretical foundation for curriculum; summer staff-development instruction; art-program planning for all classrooms on the district level; art-program implementation throughout the school year; and assessment of pupil achievement.

The Institute generates information about discipline-based art education as delivered in general classroom settings by nonspecialist classroom teachers. The Getty Institute is testing the hypothesis that teams of elementary teachers, administrators, and school board members can plan and implement systematic art programs based on the discipline of art (Greer & Rush, in press).

The Getty Center retains two evaluators[3] who appraise the Institute independently of its staff. The Center's use of thorough, objective evaluation measures is crucial to establishing the Institute's research validity, and distinguishes it from many other experimental teacher-education programs in the visual arts.

The evaluators examined the development and execution of the summer Institute and are assessing resulting art programs implemented by participants during the current 1983-1984 school year. The sample of participants and school districts is small in number and confined to Los Angeles County public schools, but its demographic characteristics represent larger populations across the country.

The Getty Center has the potential to advance research in the art education field. Art education research is typically applied in nature, idiosyncratic in design, and ignored in practice (Rush & Lovano-Kerr, 1982).

Research results were abridged and adapted from the Interim Report, Fall 1983 of the Getty Institute for Educators on the Visual Arts. The authors extend their thanks to the staffs of the Getty Center for Education in the Arts and the Getty Institute for Educators on the Visual Arts for their reviews of the material presented here.

The Getty Center sponsors art education research other than the Institute.[4] By regarding research as informative for educational practice, the Center is establishing precedent in the visual arts. The effects should be productive for the Getty and instructive for a broad spectrum of art professionals.

Art education research overlies more than one field of study. Its methods are eclectic, that is, they originate primarily in anthropology, education, and psychology; but they always serve the discipline of visual art.

The prevailing misapprehension of artists that the process of making art is completely intuitive, spontaneous, and self-referenced has delayed objective analysis of artistic expression and how it is learned. At this point, the Institute has revealed enough promise in an empirical approach to justify continuing Getty research and development efforts in this direction.

Theoretical Foundations

Adopting a discipline-based approach to art education is the reason the Getty Institute is unique among teacher education projects. The term discipline-based art education describes instruction in the concepts and processes intrinsic to the subject of art (Greer, in press).

A discipline-based art curriculum includes four kinds of concepts and skills: aesthetic (contemplating the nature of art and its role in human experience), critical (describing, interpreting, and assessing art), historical (understanding works of art in cultural or historic contexts), and productive (making art). The goal of discipline-based art education is an adult who uses the concepts, skills, and methods of art to perceive, interpret, and appraise the aesthetic properties of images.

The study of art can be a systematic inquiry that has its own intrinsic values and outcomes distinct from other disciplines that make up the general education curriculum, but that relate to them. The 1983 Institute faculty and consultants, particularly Broudy, Chapman, Eisner, Lanier, and Smith, define this position in their writings.[5]

Discipline-based art instruction emphasizes sequential activities that enable students to become more sophisticated in making, examining, reading, and talking about art. The literature and practice of art, which is the basis for instruction, is the same whether studied by adults or children.

Conceptual congruence produces an educational continuum; art curricula for children are similar to art curricula for adults. Acquisition of art concepts and skills becomes the instructional goal. Teaching moves students from a naive to a sophisticated understanding and appreciation of art at any age.

Discipline-based art education delineates concepts and skills used in making and appreciating art, and arranges them in an ordered way to induce learning. The parameters of the visual arts discipline are derived from the behavior of arts professionals who understand and practice it. Discipline-based art education attempts to illuminate internal structure and thus lends to examination by empirical study.

Research Design of the Institute

The component projects of the Getty Institute are school-district staff development, district-wide program planning, implementation, and assessment of pupil achievement. The Institute seeks to produce long-term results by providing an intense and vivid educational experience for its participants that can weather the other pressures on the educational community.

The Institute uses a team approach, involving higher levels of decision-makers such as principals, superintendents, and school-board members in addition to teachers, as a second way to ensure continuation. A third attempt to bolster implementation is to convince the participants that art has an importance for the elementary curriculum equal to the other basic elementary subjects.

Institute designers hoped participants would learn to view art education as fostering understanding and appreciation of serious works of art, and to view art as both an educative force and a cultural necessity. They expected that participants who accepted these values would subsequently teach their students to encounter serious works of art in a meaningful way, and would establish programs offering balanced art instruction in aesthetics, studio production, art criticism, and art history.

Subjects

The 1983 Institute invited 98 participants from seven out of 76 Los Angeles County school districts that reflected the County demographic characteristics, had no art consultants or art resource teachers, and were willing to teach art as a part of the regular curriculum. The seven districts represented rural, suburban, and urban neighborhoods, grades served in them ranged from K-6 to K-12, district size (attendance or ADA) ranged from a low of 2,750 to well over a half million, minority concentrations ranged from 17% to 93%, and the socioeconomic status ranged from low to high-medium.

Procedure

Summer. The 1983 summer Institute ran for three weeks. Institute goals were converted into a series of activities expected to assist in reaching goals. The 1983 staff-development operation had nine clearly distinguishable components: formal presentations, gallery visits, curriculum groups, teaching demonstrations, teach-ins, principal seminars, workshops, panel discussions, and consultations.

The 1983 summer program introduced the literature and pedagogy of art education and presented curriculum resources geared to systematic aesthetic, critical, historical, and studio activities. Sessions focused on master teachers, the acquiring of art knowledge, and learning to talk about art. Participants planned discipline-based programs for their own schools and districts that included aesthetic, critical, historical, and productive experiences and identified arts resources in their schools and communities.

The Institute presented art to district teams of teachers, principals, superintendents, and school board members in the same discipline-based way as the programs they would later teach their children. Teams studied the history of art, practiced aesthetic scanning,[6] read articles about art education, learned how art instruction contributes to general education goals, and observed a teacher[7] demonstrating one example of a discipline-based curriculum (The SWRL Elementary Art Program, 1982) in a simulated classroom situation with elementary school children.

The Institute faculty emphasized the intrinsic nature of aesthetic experience and the fact that images and image-making are central to intellectual activities such as reflection, contemplation, and speculation in any field. They regarded effort as required in order to engage in aesthetic experiences; this effort can be directed by teaching. Education without instruction in art is insufficient for becoming aesthetically literate.

School year. School-district teams subsequently engaged in year-long implementation activities. Team members provided regular art instruction in their schools: they identified aesthetic qualities in visual forms, incorporated studio production, and studied works of art (as distinguished from work produced by children) within an historical-cultural context. They emphasized art vocabulary, exhibited student work and art reproductions, and practiced aesthetic scanning in the classroom and at art museums.

The Institute staff's ongoing technical assistance during the year following the summer staff-development program encouraged lasting effectiveness of the summer's inservice education. They visited school sites, consulted with participants, attended in-school meetings and events, and published a Getty Institute Information Bulletin. Two special meetings brought all participants together, once in the fall and once again in the spring.

Evaluation Results

Summer Staff Development

Component ratings. Faculty, consultant, and staff lectures formed the largest component of the summer staff-development part of the Institute, although they consumed a relatively small amount of participants' time and effort. There were eight other clearly distinguishable components: gallery visits, curriculum groups, teaching demonstrations, teach-ins, principals' seminars, workshops, panel discussions, and consultations.

Participants daily ranked each presentation using a four-point scale. Teachers and principals highly valued formal lectures for the knowledge they conveyed; overall average rating was 3.24. Participants also valued gallery visits as enjoyable and as providing practice in scanning works of art, explaining the nature of art museums, and demonstrating the usefulness of museums as local art education resources.

The curriculum discussion groups provided one of the greatest guarantees that the Institute would have an educational impact in the schools during the following school year. Participants and staff summarized issues that had or should have been addressed as the groups moved from undirected activities to making specific implementation plans. Participant ratings on the curriculum groups, using three criteria of how useful they felt the discussion to be, how realistically practical problems were addressed, and how much they would affect their plans for art instruction, ranged from 2.93 to 3.75 on a four-point scale.

Participants evaluated teaching demonstrations on the basis of three criteria: practicality of techniques, ways of managing materials, and whether they intended to try them. They rated demonstrations highest on their provision of good and practical techniques and the skills of the demonstration teacher. Participants wanted more opportunity to observe the demonstrations.

Teach-ins were opportunities for participants to try teaching an art lesson. Participants evaluated teach-ins by the same criteria as the teaching demonstrations. Ratings for techniques and material management ranged above 3.0. Participants' intentions to try some of the approaches worked on were lower, partly because some teachers demonstrated lessons for grades other than the one they normally taught.

Attitude changes. Attitudes toward art education in three areas changed significantly during the Institute. An attitude survey given as a pre- and posttest measured a range of attitudes in three general areas: attitudes that art instructions should be discipline-based, including cognitive, affective, and expressive components; that art is teachable by nonspecialists if training and instructional materials are available; and that art is an important and relevant component of education for all students.

To measure attitudes toward discipline-based instruction, participants responded to the following kinds of statements on pre- and posttests: "children at the elementary level are too young to critique adult works of art." To assess attitudes toward teaching by nonspecialists, participants were given statements like this one: "regular classroom teachers can be expected to lead class discussions that analyze works of art." To guage attitudes toward art as a component of general education, they read statements such as this: "because art is an 'extra' in human life, art instruction is not as critical as instruction in the basics."

School-Year Implementation

The second part of the Institute was program implementation. Regular site visits by Institute staff during 1983-1984 showed Institute participants of the preceding summer to be providing sequential, systematic art instruction for at least one hour per week. In addition, participants were sharing their Institute experiences with other teachers, and were helping them teach art in a discipline-based way. Many taught art terms as part of their language-development programs, and all displayed children's artwork and art reproductions.

Pupil achievement tests referenced to outcomes of discipline-based instruction, developed by one of the independent evaluators, will be administered during the spring of 1984. Accountability is necessary for educational credibility, and the Getty Center considers evidence of learning indispensable to curriculum implementation and important for distinguishing discipline-based programs from those that stress outcomes other than the teaching of knowledge and skills.

Probabilities and Possibilities

The Getty Institute will continue as a research and development activity in the Los Angeles area for several more years. The 1984 Institute will include master classroom teachers from a new group of schools. Present aims are to train additional teams each year until teams from at least 10% of the schools in the district, or a total of four teams, have attended the Institute.

In a field as scientifically imprecise as art it is unusual to see so systematic an approach, and one that lends itself so well to empirical research. While operating in such an organized mode, the staff of the Institute never lost sight of their ultimate objective--teaching art education.

The Getty Center for Education in the Arts is proceeding cautiously and systematically in establishing the 1983 Institute. The Center is attentive to the need for ongoing evaluation and re-examination as a way to refine the Institute as its staff, faculty, and participants gain experience and expertise. The Getty Institute procedures for self-critical feedback produce large amounts of data usable for further revision and development.

Continuing research with direct application to practice is seldom seen in art (or other) education (Eisner, 1984). The Getty Institute may eventually remedy complaints that art education research rarely affects practice; the Institute's structure offers the possibility of future application of its research findings so necessary to ongoing research activity, and so infrequently seen in art.

Research is concerned with the discovery of meaning, and the Getty Center can provide the kind of long-term commitment that real

research progress requires. With the Institute, the Center has made a notable beginning toward achieving one of the goals of The J. Paul Getty Trust: the enhancement of the understanding and appreciation of the visual arts.

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Footnotes

[1]Center Staff: Leilani Lattin Duke, Director; Marilynn J. Price Program Officer.

[2]Institute Staff: W. Dwaine Greer, Director; Frances Hine, Ronald Silverman, and Ruth Zwissler, Associate Directors; Lila Crespin, Consultant.

[3]Ralph Hoepfner, Evaluation Consultant in Education; Blanche Rubin, Art Education Consultant.

[4]An assessment of art education programs in seven public school districts in California, Illinois, Minnesota, New York, Ohio, Virginia, and Wisconsin is now in progress. Case studies are being prepared by five educators with art education evaluation research experience, in collaboration with Milbrey McLaughlin of the Rand Corporation: Michael Day, Elliot W. Eisner, Robert Stake, Brent Wilson, and Marjorie Wilson.

[5]1983 Institute Faculty: Harry S. Broudy, Laura H. Chapman, Michael Day, Elliot W. Eisner, Edmund B. Feldman, Vincent Lanier.

1983 Institute Consultants: Warren H. Anderson, Gilbert A. Clark, Hermine Feinstein, Jean C. Rush, Pamela Sharp, Ralph A. Smith.

1984 Institute Faculty: Harry S. Broudy, Michael Day, Margaret K. DiBlasio, Jean C. Rush.

[6]Aesthetic scanning is a method of looking at a work of art that focuses on identifying and discussing its sensory, formal, expressive, and technical properties. Participants practiced aesthetic scanning of real art (not reproductions) during their museum visits.

[7]Lila Crespin, Vice Principal, Cogswell Elementary School, Los Angeles.

The Philadelphia Museum of Art Institute as Research and Development

Theodore H. Katz
The Philadelphia Museum of Art

The Philadelphia Museum of Art Institute (PMAI) is a two-year state-wide project that brought together museum educators, university faculty, school administrators and classroom teachers to investigate using the visual arts in the teaching of traditional classroom curricula. The program is co-sponsored by the Philadelphia Museum of Art and the Pennsylvania Department of Education (PDE), and funded by the National Endowment for the Arts, the Container Corporation of America, the Pittsburgh Foundation, the Pennsylvania Department of Education, and the Foerderer Endowment for Education Through the Arts. The Museum hosted the same diverse group of educators, including seventy classroom teachers who represented school districts from throughout the State of Pennsylvania, for two weeks of activities during the summers of 1982 and 1983. During the ensuing school years, the classroom teachers integrated newly discovered ideas about the visual arts into their normal curricula and found that discussion and interpretation of works of art enhanced their students' understanding and appreciation of the subject.

Origins

The genesis for this project grew out of discussions within the Museum's Division of Education about the Museum's role and purposes in providing educational services. Traditionally, services had been provided and administered by professional staff or volunteers inside the institution. Although outreach visits were made to schools and other community organizations, the prevailing philosophy was that the art collections provided the most potent experience for the visitor, and that efforts should concentrate on bringing people into the building. The obvious limitations were that the relatively small Museum staff could directly serve only a finite number of visitors and these visitors had to fit museum-going into their normal routine. Also, during these visits the Museum staff presides over the learning, and the teachers are generally bystanders.

Therefore, we chose to explore a mechanism for bringing the essence of the Museum to the schools, i.e., through its teachers. This would not only extend our educational services but also accommodate our educational philosophy of the museum as a resource. By bringing teachers to the Museum and having them experience the collections under optimum conditions of both group and invididual contemplation, the stage would be set for transference. It was hoped that their individual reactions to what they learned at the Museum would spark creative applications and infuse utilization of the visual arts into their teaching the following year.

Basic Issues

It was decided that the Museum and the PDE would co-sponsor the project and oversee the administration; that a faculty would provide bridges and experiences to make interpretations of the Museum's collections; and that the teachers would demonstrate the transference and integration of their experiences with the visual arts into their teaching routines, enhancing the quality of learning in their classrooms.

Because this was a new idea for the Museum, it seemed wise to establish credibility for the project as soon as possible. Therefore, an advisory board was established. The board met at the Museum and a statement of philosophical, thematic, programmatic and political principles of the PMAI was developed.

The advisory board pointed out that some programs which had already proved successful had the following parameters: participation was limited to teachers from one region for ease of logistics; participation was limited to either elementary school teachers of one subject only, preferably social studies or English for natural affinity with the visual arts; participation was limited to or included art teachers to avoid feelings of exclusion or fear that the program might diminish or usurp their position in the schools.

Although warned of the pitfalls of the more experimental approach, it was decided that part of the challenge and contribution of such a project would be to create and test new concepts, to study a new set of relationships among protagonists and to implement and administer such a project. Therefore, it was decided at the beginning to invite classroom teachers from throughout the Commonwealth of Pennsylvania, grades K through 12, of all traditional academic disciplines but exclusive of the visual arts.

Preparing the Program

It was at this juncture that the Pennsylvania Department of Education contributed not only theoretical advice but very practical help, by allowing us to work within the framework of the state system and to facilitate the steering of our project through appropriate channels. The project met the standards of the state goal in arts and humanities which states that "quality education should help each student acquire knowledge, appreciation and skills in the arts and humanities." The preamble to the statement on goals of quality education gives primary responsibility to the schools, but adds that "they must work in close and continuous cooperation with the family, community, and other appropriate social, religious and governmental institutions to ensure the highest possible achievement of these goals." By meeting stated and approved goals of education fo the state, accountability was provided for the developing project.

The next question addressed was how long the teachers should or would remain involved in such a program. It was decided that a two year period was a reasonable length of time to give the participants a chance

to experience and adjust to failures and successes, to develop confidence in their extended roles, and to deal with the pressures of change.

Attracting Participants

Without the support system of the PDE, we would not have been able to engender statewide teacher involvement. Initial dissemination of PMAI information was accomplished at a meeting of the executive directors of the 29 Intermediate Units into which all of the schools of Pennsylvania are divided.

Following their endorsement, announcement posters and application forms were distributed from the PDE to the principals of schools throughout the state. The applicants were required to write essays on how they thought the PMAI might benefit them and their students, and to describe their general philosophies of teaching and previous experiences with interdisciplinary teaching. These essays, as well as application forms, were submitted to school principals who, in turn, forwarded them to the district superintendents, and again to the Intermediate Unit directors who sent them to the education staff of the Museum.

None of these administrators had selection responsibilities, but the somewhat long forwarding process was a device to ensure their knowledge about the project on every level, and was an implicit affirmation of their consent and support for the project.

From 153 applications received, 70 teachers were invited to participate in the PMAI. The poster stated that the PMAI was "not recommended" for art teachers. It was made clear to participants that the exclusion of art teachers was not for the purpose of training non-art teachers to replace their schools' art teachers, but rather to build more broadly based support for the arts with such non-arts teachers.

The demographic profile of the participants indicates that the majority were white, female (86 percent), married (53 percent), middle-aged (75 percent between 31-50), and of middle-income (82 percent between $10,000-$50,000). Fifty-one percent had masters' degrees in education or special subjects.

As for their specific teaching roles, 29 percent were elementary school teachers, 55 percent taught specific subjects in secondary schools and 16 percent taught special education or gifted students. The teachers came from 40 different school districts and represented 21 out of 29 Intermediate Units.

The First Summer Session

Much thought was given to the content of the first summer session. How, in a period of only two weeks, might we provide relevant insights into the collections for an unknown and diverse group of teachers? An early suggestion was that we provide a "palatable" art history survey. But what would it mean to be "palatable?" We found ourselves falling

into the trap of considering the collections to be the primary resource. But what, then, did the teachers bring to this enterprise?

A breakthrough occurred when we began to consider the teachers a resource in their own right. What information could we share, and how could we share it, so that they could, in turn, immediately share information with us, quickly establishing a dialogue with relatively equal weight?

Were we, then, to be considered a teacher training program? Not overtly. We trusted the teachers to be, from their application essays, mature and experienced professionals. They had been teaching for many years, their average age was 42, and stood to be offended by a program aimed at "teacher training."

We organized the participating teachers into five teams with 14 members each, based on geographical distribution. This was to facilitate networking, reunions, and other means of support during the following school year. Each team was joined by a faculty of three: an art historian, a museum or art education instructor, and a resource specialist, namely, an administrator with classroom teaching and curriculum development experience. The faculty was composed of personnel from the Division of Education at the Museum, and administrators and educators from other Pennsylvania, as well as out-of-state, museums, universities and schools.

The role of the art historian was viewed as being primarily a resource for scholarship, information and interpretation of the collections. The art educator or museum educator was the counterpart in the Museum of the classroom teacher, with a role in demonstrating how to work with the art collections in ways appropriate for children. The role of the resource person was less specific but of crucial importance as a facilitator between the faculty and the teacher participants.

Although each team participated in all the formal lectures, demonstrations, and presentations, there was considerable autonomy among the teams in the planning of free time and informal activities. One of the most difficult challenges for each faculty group was to synthesize their respective strengths and talents and to be flexible enough to accommodate the ever-changing needs and aspirations of their team members, and to plan activities that would address the interdisciplinary diversity of their team.

The summer session was structured to provide a system of collaboration which encouraged both teachers and faculty to test themselves in a supportive environment in which competitiveness did not become constrictive, inhibiting individual development and expression. This seemed critical, particularly if the teachers were personally to extend their curricula to integrate the PMAI experience into their classrooms. In fact, there developed a strong sense of collegiality among the teachers, fueled by, according to many, renewed professional pride.

During the first summer session the Museum's collections, and the visual arts generally, were "viewed" through several "lenses," each one introduced by a guest speaker. It was hoped that this would provide the needed focus through which all teams could apprehend and appreciate the collections. The lenses included, in order, perception, cognitive learning, visual language and literacy, material development, state network of resources, and institutions. This proved to be a workable approach to building bridges between teachers and the Museum.

In general, the teachers responded enthusiastically to respectful attitudes, rigorous presentations, and hard work. They were notably fair in allowing for good and bad days, activities, and so forth. As recognition, respect, and responsibility were accorded them they developed self-confidence, assertiveness, and independence.

In order that teachers focus their summer experiences through practical development and expression, each teacher developed a project during the two weeks, using a common project outline as a guide. The project, a copy of which was submitted before leaving, would be tested in the classroom during the ensuing school year.

The nature of the projects varied greatly, as we hoped they would. For example, a science teacher explored the visual arts to help teach classification, forming hypotheses and drawing conclusions; an elementary school librarian used the visual arts to stimulate and reinforce verbal skills, recording skills, and judgment; a world culture teacher introduced to her students a study of artistic propaganda and censorship and their effects in World War II and in Communist countries; an elementary school teacher produced at her school a "Festival of the Arts," demonstrating how the visual arts and literature express ideas, beliefs, and political and social conditions.

Field Work

The PMAI developed several mechanisms for providing teacher support and monitoring projects during the 1982-83 and 1983-84 school years. A broad two-way field program included newsletters from the Museum, bi-monthly project reports from the teachers, and two classroom visits to each teacher by a PMAI faculty member. These visits were made either by a Museum faculty member or by faculty members from other cooperating museums in Pennsylvania such as the Carnegie Institute in Pittsburgh and the Allentown Museum of Art. All three museums hosted regional reunions and educational programs as well.

The Second Summer Session

The teachers returned for the second summer session more aware of their specific interests in the Museum's collections in terms of their classroom needs. The team structure remained the same. Five artists worked with the teams, examining the creative process.

The teachers learned that, as participants in the PMAI, they were actively involved in creative processes, including exploring new

relationships, formulating ideas, producing forms for these ideas, implementing change, and developing support systems. The artists formed an important bridge from the Museum's collections to the teachers, establishing the teachers as creators, rather than relatively passive transmitters of established curricula. During the second summer session, teachers made more confident and assertive use of the Museum and PMAI faculty. As one faculty member stated, "The teachers taught us how to teach them."

Other issues discussed were severance from the PMAI, reentering the school environment, building support systems, and defining the legacy and continuing challenge of the Institute. It was generally agreed at this point that the projects were merely vehicles for initially working with the Museum's collections.

Evaluation

Evaluation questionnaires and the interpretation of their data, which are still ongoing, were provided by a consultant who specialized in evaluation material for museums. Teacher participants and faculty filled out several forms with both short answer and essay questions which analyzed their demographics, general cultural and museum going habits, expectations of the PMAI, assessment of the content and presentation of its activities, atmosphere, structure, strengths, weaknesses, and accomplishments of its stated objectives.

In addition to questionnaires, other evaluation mechanisms included the field visits in the classroom by PMAI faculty, and progress reports about projects by both teachers and faculty field representatives. Finally, in order to assess local support for individual teachers, questionnaires were sent to principals, district superintendents, and Intermediate Unit executive directors. Results show that the vast majority were not only aware of the PMAI and knew which teachers were involved, but had also observed or discussed the projects with the teacher.

The evaluator concluded that the major strengths of the PMAI were "...the personalities, expertise, and diversity of the faculty; the team organization; the Museum and its collections as a setting; the range of teaching specialties of participants; and the training they received in looking at works of art."

The Philadelphia Museum of Art Institute As a Vehicle for Inservice Education

Jessie Lovano-Kerr
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A subtitle for this discussion is: The Assessment of the PMAI as an Instructional Format for Nonart Teachers: Participant-teacher Interaction, Participant Response, Curriculum, and Learning. Before taking on such a task, it might be well to clarify what we mean by "inservice education." Then we can determine to what extent the PMAI was effective as a vehicle for inservice education, keeping in mind that its main goal was to provide a program for non-art teachers of grades K-12 to learn how to integrate the visual arts into the teaching of traditional classroom subjects.

The basic intent of inservice education is planned educational change. It focuses on teacher growth and re-education. It also attempts to provide the means for continuing the effects of the in-service education through such methods as practice, evaluation, internal and external rewards, and routinizing new learnings. An ideal inservice program would lead to subsequent self-instruction, self-practice, and more permanent networking among groups and invididuals. In addition, the outcomes of successful inservice education programs should result in professional and personal growth as manifested in new teaching methods, new attitudes, improved human relations, and new friendships.

For such educational change to occur, it is essential for the inservice education model to be based on collaborative efforts among various groups, agencies, and organizations. Effective collaboration is built on a base of strong commitment, as well as mutual trust and respect, from all involved. A review of the PMAI institute has provided convincing evidence that it is indeed a very effective and viable vehicle for inservice education.

The basic elements of the PMAI model that contribute to its power as a vehicle for inservice education start with its initial collaborative process. An advisory board was convened consisting of nationally and state known advocates of arts in education. Together they helped to develop the format of the Institute. Basic to this format is the role of the museum in the community as a valuable educational resource serving the needs of teachers and students. The main goal of the PMAI was the integration of the visual arts within required subjects and not the replacement of art teachers.

Another early collaborative effort was the involvement of school supervisors, administrators, and regional educational directors in the participant selection process. This resulted in the selection of 70 participants representing each of Pennsylvania's 29 Intermediate Units which are regional educational agencies.

Collaboration permeated all stages of the model and was exemplified in individual and group relationships such as faculty teams, resource persons, participants. It formed the framework with which to

accomplish the main goal for the 1st summer--to develop a strong sense of collegiality among the teachers. For new energy and enthusiasm to be generated, the Institute recognized the need to address the personal as well as the professional needs and interests of the participants. The program for each of the two summers reflected a recognition of these two very basic related needs. Participants were regarded as professionals on par with the Institute faculty and guest lecturers. They participated in determining formal and informal educational experiences of the Institute. The museum became their classroom. They interacted with a wealth of original art works.

During the 1st summer the program of the two-week Institute focused on the museum collections and visual arts. The goals were to teach teachers how to look at works of art and how to use the art museum as a resource for classroom teaching, as well as to increase self-confidence in using visual arts in the classroom, integrating them with the teaching of classroom subjects. Participants designed projects integrating the visual arts with their subject specialty to be implemented in their respective schools during the academic year.

The Institute's model provided for an extended inservice component of museum and school collaboration as a continual growth and support network for and among the participants during the school year. This included bi-monthly progress reports from the participants, site visits by a museum staff person, a period Institute newsletter, and participant group meetings for social and professional purposes.

A formative evaluation assessing the effectiveness of the first year was used to determine the educational and social experiences for the second year. The same participants were returning for a second Institute. They returned with a sense of confidence and excitement after a year of experiencing success with the visual arts in their classrooms. Participants were more assertive in their use of the museum and faculty and more aware of their needs. The extended in-service component during the school year was repeated after the second summer Institute.

The networking extended well beyond the circle of the participants to their colleagues, administrators, community, and professional organizations. As a result of the Institute and their encounter with the visual arts, participants experienced personal growth and enrichment which were manifested in new attitudes, new teaching methods, new friendships, and increased student interest and enthusiasm. They have become advocates for the visual arts, voicing their convictions among their colleagues at faculty meetings, at professional meetings, within the community, and in publications.

The main strength of the PMAI model of inservice education is in its potential to truly mainstream art in the public schools. By including the visual arts to enhance and to extend the knowledge base in required, non-art subjects, more students, as well as teachers, would experience the visual arts who otherwise might not encounter the arts in a formal context. By focusing on the use of critical sensibilities and art criticism skills, students and teachers could become aware of

art as one of the fundamental forms of knowledge, communication, and expression, and as a means for the coherent organization of experience. As the visual arts become embedded and integrated in the context of required subjects, they could become viewed as a basic skill, basic to education. The visual arts contain the characteristics of those subject areas designated as basic skills such as: a distinct and unique language to be learned, symbols to be used, and imagery to be developed and interpreted. The visual arts are basic to education. They are a truly distinct form of knowing, communicating, and expressing. To carry this projection further, if art were to be viewed as basic to education and as a basic skill, it would become a required subject with the expectations that its specific skills and knowledge would continue to be part of all subjects.

The primacy and need for advocacy of the arts would diminish. The focus would be on change at the higher education level and on resources for instructional purposes at all levels to accommodate the new role of the visual arts in education. The PMAI model is a potentially powerful vehicle for inservice education as a change agent. I say potentially because the model needs to be recognized for its power and perpetuated by replication on a large scale basis. To date, there are four states that plan to replicate this model: New Mexico, Nebraska, New Jersey, and Florida. As results are accumulated and the data base broadened, the relative strengths and weaknesses of the model can be assessed and the model revised accordingly for further use and evaluation.

A Study of Infant Musical Productivity

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Detailed information about the early musical responses and productivity of normal children prior to two years of age is notably absent. In contrast, other areas of child development such as language acquisition have been widely studied. This void led to the present exploratory study of three children of three contrasting musical backgrounds: one in which the parents are professional musicians; one whose parents are musically oriented but not musicians by profession; and a third in which the parents are not musically oriented. The study is directed by three questions: (a) What is the immediate context that signals the beginning and end of musical behavior? (b) What are the distinctive features of early response and performance? (c) What are the characteristics of early songs? Each child was observed in all relevant family settings over a period from birth to two years of age.

Method

The three children selected were all first born females of similar socio-economic status. Each was observed weekly during their first 24 months in a variety of contexts. Length of observations varied from 15 minute intervals to half-day sessions. An attempt was made to sample a variety of settings and times of day, such as eating, playtimes, naptime, and family gatherings such as birthday parties.

The observer recorded any spontaneous music productions such as pitch modulations, vocalizations or body rhythmic movements, including the contingencies of the situation, persons, objects, and sounds involved as agencies for these responses. Each immediate family member was interviewed concerning their own musical history, mode of transferring musicality from one generation to the next, and such aspects of the child's performance as: favorite songs, records, instruments and occasions for musical behavior. Mothers were observed in their use of lullabies with the babies. All parents were observed to sing adequately. Each child's musicality and contexts were analyzed with particular attention to their songs. Songs were analyzed in terms of song-form (phrasing, endings), substructures (rhythm, melodic contours) and performance (renderings, interpretation).

This approach provides an earlier period of observation (0-12 months), more family context data and more child performance data than the one other study presently in the literature, that by McKernon, of children from one to two and a half years (McKernon, 1979).

Results

Case I: Professionally Musically Oriented Context

Family musicality. These parents are both professional musicians and are actively involved in study, practice, teaching, performance, and

attending productions in the arts. Music is present in the home in a multitude of forms, from parents' and grandparents' performances and practice, to records and instruments. All adults were aware of this child's musical response, reporting changes and activity to the investigator and one another in technical terms such as singing in "thirds." They arrange musical experiences via instruments (piano, guitar, autoharp), singing, or recordings. At family gatherings music played an important role with frequent singing around the piano, performing, and listening to recordings and television performances. This was truly a musically "literate environment" comparable to the "literate environments" of early readers.

Mother and grandmother engaged in singing conversations which will be described below. These songs took place during caretaking periods and while rocking and general interacting throughout the day.

Child's responses. During the first 5 months, music production consisted of a continuous blend of sound, oscillating over a rather narrow range and punctuated by higher, loud screeches. These songs occurred most frequently as a response to and in conjunction with mother's songs. Distinctive features for melodic performances were apparent with a descending glissando on "ah" at 6 months, in the mother-infant and grandmother-infant context at nap times. At 6-7 month period, the glissando was repeated and expanded with repetition of the final pitches, this was later reversed to an ascending pattern. At 8 months, alternating third and forth intervals were added to the repertoire induced by the cuckoo clock. At the same time a three note pattern evolved. These elements were combined and recombined in a variety of patterns during the next 3 months.

It is important to note that none of the features noted here for the ages 6-12 months are reported in the McKernon (1979) article. Judging by her remarks, these phenomena may have occurred in her sample from 12-18 months. It is also possible that other musical behavior may have been present and developing during the first 5 month period but remained unobserved by the investigator.

Primary singing time was during car rides, nap times, early morning waking, and interactions with mother and grandmother. At 12 months, mother and child carried out singing recitatives. Agencies for music production were: voice, piano, guitar, autoharp, cuckoo clock, records, and radio music. Father played the piano and child sang and played with one finger on one note at a time.

Interruptions of music occurred more often as the result of voices, nonmusic sounds, or favorite books. The child typically returned to the music activity. Mother and grandmother engaged in singing conversations, modifying melodies perhaps somewhat similar to "motherese" in early language development ("singerese"). These were characterized by: repetition of a short phrase, narrow range, and holding the child while rocking her in rhythm. Mother created songs for lullabies, sand "Away in a Manger," and a lullaby created by her great-grandmother.

Songs. Songs appeared at 12 months with an extensive repertoire at 24 months. These developed from the mother reading and singing nursery rhymes and stories at bedtime using a "scaffolding" procedure mentioned by Ninio and Bruner (1976), where the child filled in words. On morning waking and at play, the child would sing or pretend to read songs to herself. The mother corrected songs and sang along on difficult passages. At times the father accompanied the songs at the piano. Of interest here is the development of vocal technique. On one occasion the child was having difficulty with an octave interval jump. Noticing this problem while riding in the car, the grandmother told her she could sing that note if she "breathed in a great big breath with lots of air, opened her throat as if she yawned a great big yawn and then sang the note." The child followed these instructions and the note was easily sung. The results of these kinds of teachings was a great reduction in the kinds of pitch, rhythm, and melody errors more characteristic of the McKernon sample and cases II and III below.

Song-form. The melodic contour appeared first, followed by the rhythm, and then the words. She begins with the standard tune contour at 12 months, perceiving first the basic melodic structure of the song, its first phrase, and most salient features. This is expanded through practice to the overall expression of the melodic contour of the song. She participates in extensive manipulations of songs, making up and adding new words to old tunes. The rhythm is increasingly incorporated with the words following later and performed with very precise diction. Singing was characterized by accurate pitch and rhythm, distinct diction, basically correct lyrics, technique, and musical expression at 24 months.

Substructure. Rhythm developed from random groupings, to groups with underlying beat, with a regular beat maintained at 2 years. Vocal range was G# to C#'. One of the most salient observations is her demonstration of self-correction which displays assimilation of harmonic and rhythmic structure. On several occasions she made tonal correction in "Happy Birthday" and "Baa Baa Black Sheep." Rhythmic adjustment was observed in "Old MacDonald" and "Ten Little Indians."

In this rendition of "Happy Birthday," the phrases are sung very slowly with a smooth legato line. The tonal self-correction is demonstrated in the third to fourth phrase. Here she loses tonality in the 3rd phrase but ends correctly. The wide jump between the phrases and within the third phrase, make this tune most difficult. The singer demonstrates vocal technique opening her mouth wide, taking a big breath, and "throwing the air" to sing this leap.

Case II: Musically Oriented Context

Family musicality. These parents are not professionally trained musicians but are musically oriented insofar as music plays a major role in the home at family gatherings, singing together, and sharing musical experiences with recordings and concert attending. Both parents sing and the mother plays the piano at an elementary level. Both parents sing songs with the child and provide musical experience via recordings, piano and music at church. They were aware and interested in the child's musical responses, although they did not report the

productions and responses in technical language as in Case I, but sang examples to the investigator. The mother does not create songs for the child as in Case I, but she does sing nursery rhymes and parts of nursery rhymes to her.

Child's responses. Development was similar to Case I but at a later age. Music response was first observed at 4 months with arousal modulation with a music box with the mother. At this time mother began to sing simple childhood songs and nursery rhymes while baby watched her face intently, listening and vocalizing on a sustained pitch or oscillation carrying the phrase with each breath. At 8 months she responded consistently by clapping and "dancing" with recorded music. The descending glissando was observed at 10 months, and at 15 months, alternating third intervals and the three note contour. These did not receive the degree of manipulation as with Case I. Songs began at 16 months and were clearly distinguished at 20 months. By 24 months she created story songs to accompany play and performed with the curtain pull cord as a microphone.

Agencies for music were mother's voice, records, radio music, piano, music box, the toy xylophone, and singing into the curtain pull cord. Productions were observed during mother-child and father interactions, initially prior to nap time, then as an accompaniment to play or care taking activities. Parents reinforced productions with attention and repetition, but did not expand them with the singing conversations as with Case I. Interruptions were a result of loud noise or people, where she typically returned to music activity. Mother sang two lullabies, "Muffinman" and "Silent Night."

Songs. Songs developed while interacting with the mother, the earliest observed attempt at 16 months and increasing at 20 months in accuracy and frequency. The mother played songs at the piano while the child sang along. She extended these songs during play times as an accompaniment to any activity and then in her performances for family and pretend audiences. She also requests having her songs tape recorded.

Song-form. Case II, as with Case I, began with the tune contour holding together the event, and adapting idiosyncratic kernals which function to end songs and maintain structure. Words follow rhythmic melodic development but lack the precise diction and tonal-rhythmic accuracy as in Case I. The performance of the song maintains the overall flavor of the songs. The characteristics of her songs are: definite beginnings and cadences, complex rhythms with typically a basic rhythmic motive suggested or maintained. Lyrics do not appear to be as important for her as with Case I since when unsure of words, she willingly substitutes a syllable, words from other songs, or just skips and continues. The overall production is the main event. Diction is unclear and difficult to understand at times, she does, however, sing in phrases, and original songs contain a story content.

Substructure. Although the basic character of the song is maintained, Case II is not as accurate in pitch as Case I. There is not a definite key or tonality maintained but a shifting. Songs do, however, end with a definite ending. She does not seem to be as aware of these

changes as Case I, who self-corrects her errors. At 24 months she sings a vocal range of "B" to "B'" (Doe a Deer). Most interesting is her use of cadence to end a song, even though the tonality of the ending cadence is not related to the rest of the song. This formula is demonstrated in most of her songs. The most tonally consistent song is her original composition, "Kitty Song." Although there are frequent pauses, we find examples of melodic sequence, complex rhythm patterns along with a story content. This song suggests that this child may feel a greater degree of freedom to experiment in her own creations than in the standard songs she sings.

At 24 months Case II is not as rhythmically accurate as Case I. She does however group regular, consistent rhythmic patterns within phrases. "Mickey Mouse" and "Doe a Deer" particularly show incorporation of the basic rhythmic element of the standard tune.

Performance. Frequent song renditions were given for family and pretend audiences. The overall musical character of the tune was communicated through musical techniques such as: phrasing, word emphasis, and final cadences with retards. Performance is an important ingredient of this child's songs.

Case III: Nonmusically Oriented Context

Family musicality. Contrasted with the above cases, parents in Case III are not music-oriented in the home, although both parents sing adequately and participate in church choirs. The parents were not aware of this child's musical responses and productions and did not report any details of the child's music activity to the investigator. They did not provide musical experiences in the environment, with the exception of infrequent records and television. The mother did not report any particular lullaby and was not observed singing any lullaby to the child. Music did not play a role at family gatherings as with Cases I and II. In fact, while observing birthday parties of all three families, Case III almost forgot to sing "Happy Birthday." She then sang one verse, where the other two cases sang three verses and had a "sing along" time during the celebration with both children singing performances for the gathering.

Child's responses. Music behavior was first observed at 18 months in the context of "Sesame Street" with dancing and singing on a single sustained tone. At this same time the mother began to sing Christmas carols and the child responded with dancing to the music. Noticing this enthusiastic response, the mother then began to play records more frequently for the child, who responded with dancing rhythmically to the music. The mother also read nursery rhymes regularly and at times sang them for her. This response was increasingly evident at 20 months with the child attempting to sing along. The features of this singing were basically the words which were more spoken than sung and only later were there the inclusion of part of the tune.

Transitions for this child occur particularly when toys or people enter the boundary. She does not typically return to the singing or music after the interruption. She does not readily sing when asked and

does not sing in accompaniment to activities, such as play, naps, car riding, and general interactions as with Cases I and II. Singing and music are a separate and distinct activity initiated by singing on the television or specific listening to records started by the mother. A lullaby was not observed or reported by the mother.

Songs. Singing was initiated by the mother or requested by the observer. Few spontaneous opportunities presented themselves to observe songs. At times the child responded to "Sesame Street" with singing as described above, although she did not often sing at an audible level. It may be important to note that she did speak with an audible, clear voice in interactions.

Song-form. Case III, demonstrating a different approach than Cases I and II, begins with the words, as reported by McKernon (1979) then includes rhythm and lastly melodic development preceding from the kernal or first phrase to the general overall contour. For Case III then, the words and rhythm hold the event together.

Substructure. Songs progress from lyrics to rhythm to increasing levels of melodic incorporation. As cited above, Case III does not always produce discrete tones, but rather speaks the tune; at times on a unitary pitch degenerating progressively into speaking the song. Here she incorporates the general rhythm of the words. By 24 months she sings parts of the song along with the spoken sections.

Attempting to stimulate response the investigator brought a guitar at 24 months and allowed the child to strum the strings while the chords were changed. The child requested songs to be played and heartily strummed the guitar. She sang very little and almost inaudibly. The following weeks the guitar playing continued at the child's request. At this time she made up a spontaneous song. The chords were fingered by the investigator, while the child strummed the guitar and sang. It is interesting to see that she strummed the guitar with a steady, regular beat while she sang.

Performance. Songs were not observed to be performed for any audience, real or imaginary, but were primarily private events, usually in conjunction with television music, records, or nursery rhymes with the mother, and later at the investigator's prompting with the guitar. Few, if any, musical interpretative devices were apparent by 24 months, except for some variations in dynamics--loud and soft as emphasis of words.

Discussion and Conclusions

The differences between the above three children, particularly I and II versus III, suggests a strong relationship between home stimulation and the speed of development. This is hardly an unexpected finding in the light of developmental literature. Naturally we can only speculate about the genetic factor. However, as with studying language, many cases need to be documented. What is perhaps more important is the discovery that the character of developmental stages varies for the

"musical" versus the "non-musical." Just as there are different ways in which children first learn language, so there appear to be different ways in which children learn to be musical. The musical children proceeded to music from a musical base; the non-musical child from words and rhythm. The stage of development between ona and two years when language usually develops might be critical in determining which of these kinds of progress is adopted. Perhaps the acquisition of musical skill prior to the acquisition of language always makes the owner an inherently musical thinker; whereas the acquisition of musical skill after the acquisition of language may interpose that later competence between the learner and his or her music. When these results are compared with McKernon (1979) it becomes clear that her subjects are of the musical status of Case III in the present study.

Comparing our work and McKernon's (1979) leads to three conclusions. First, Case III and McKernon's subjects seem very similar in their music development. Secondly, there are at least two approaches to standard song development demonstrated. As there are different ways children learn language, so there appear different ways children learn to be musical. Musical children proceeded to music from a musical-melodic base, the nonmusical from words and rhythm. Lastly, results on comparison of standard song and spontaneous song development, although not the focus of the present study, seem mutually supportive. There is some preliminary suggestion that children may practice with greater experimentation in spontaneous songs.

There are implications suggested by these findings for the importance of the musical environment and context in early childhood education, much as in creating the literate environment for language and reading development. In addition, early educators need to be alert to individual differences in musical production. The study of early songs may provide new opportunities to observe the development of imaginative and cognitive growth in young children.

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Contextual Information Effects on the Categorization of Differences Among Photographs

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In 1966 Lanier recommended that art teachers recognize photographs as significant objects for art appreciation. Chapman (1978) heightened the status of photography within art education when she devoted an entire chapter to photography, film, and television in her influential textbook. Although many art educators regard photographic art as an important visual artform, few have designed programs that educate students' understanding of photography beyond its technical dimensions. Such practice is not unexpected when limited theoretical informaiton is available to guide curriculum development in thinking and talking about the interpretive aspects of photography.

One of the few sources that offers a framework for appreciating the differences among photographs through interpretive thought and talk was developed by Barrett (1980). His structure avoids traditional subject matter categorizations by asking viewers to consider photographs as if they were analogous to various types of language statements: (1) descriptive, (2) explanatory, (3) interpretive, (4) ethically evaluative, (5) aesthetically evaluative, and (6) theoretical. Barrett's categories are designed "to open a directed discussion about photographic meaning in order to increase understanding and appreciation of the variety of photographic statements made" (p. 53). The categories are neither discrete nor exclusive. All photographs, for instance, are descriptive, however the function of a photograph, or its "aboutness," may have more to do with an explanation of the world, with an ethical evaluation, with an aesthetic evaluation, or with the artist's personal interpretation of the world. It may otherwise be a photograph about photography and thus function as a theoretical statement.

According to Barrett (1980) descriptive photographs are those that are analogous to statements of fact in language. They are visual recordings of empirical qualities and attempt interpretive and evaluative neutrality. Examples of descriptive photographs include identification photographs such as drivers' licenses and school ID cards, medical x-rays, and the NASA space exploration photographs.

Explanatory photographs are categorized by Barrett (1980) as those that "attempt objectivity in explaining how things are. They are falsifiable in the sense that they could potentially be empirically demonstrated to be true or false, accurate or inaccurate" (p. 53). Examples of explanatory photographs noted by Barrett include most press photographs, Eadweard Muybridge's animal locomotion studies, Bill Owens' books, Suburbia and Our Kind of People, and Bruce Davidson's book, East 100th Street.

Interpretive photographs contrast explanatory photographs in Barrett's (1980) framework in that they are poetic, fictitious, and nonfalsibiable. In cases of dispute, interpretive photographs cannot be empirically confirmed nor denied as can explanatory statements. Barrett identifies the following cases of interpretive photographs: Duane Michals', "The Spirit of Leaving the Body," and "The Creation." Most photographs by Jerry Uelsmann and Minor White exemplify this category.

Barrett (1980) characterizes ethically evaluative photographs as those that imply valuations, moral, judgments, or those that generally promote conceptions of how things ought or ought not to be. Examples of ethically evaluative photographs noted by Barrett include W. Eugene Smith's book of photographs entitled, Minamata, that portrays the suffering of village fishermen in Japan as a result of industrial pollution. Photographic advertisements also fall into this category by presenting viewers with what they ought to seek in attaining the "good life." Propaganda photographs are likewise categorized as ethically evaluative by Barrett.

In contrast, Barrett (1980) characterizes aesthetically evaluative photographs as visual notifications of what photographers find intrinsically valuable for appreciation. Emphasis is given to the relationship that appear among the visual elements of a photograph's imagery, and thereby function as visual statements of what the photographer finds ugly or beautiful. Among the many aesthetically evaluative photographs that exist are most works by Edward Weston, Ansel Adams, Aaron Siskind, Harry Callahan, and Joel Meyerowitz.

Theoretical photographs are categorized by Barrett (1980) as those that address the issue of art and photography. They function as visual commentary or as visual art criticism, and can best be described as art about art rather than art about life. Examples of theoretical photographs include Tom Barrow's cancellation series, Duane Michals' "Alice's Mirror," and Les Krims', Making Chicken Soup. The latter is a visual cookbook for making chicken soup and is dedicated to "concerned photographers." Krims' elaborate critical sarcasm is aimed at those who attempt to solve social problems with photographs. In Krims' view their efforts are as useless as is the making of chicken soup to cure physical ailments.

This study was designed to determine whether contextual information, in this case titles, affects the differentiation of photographs within the category system outlined above. An earlier study by Koroscik, Desmond, and Brandon (in press) found that the semantic analysis of photographs was subject to the availability of contextual references to descriptive and interpretive characteristics of photographic imagery. Subjects were presented with either descriptive titles that made literal reference to objects, persons, or events depicted in a work (e.g., "Revolving Door," and "Woman in Purdah," or interpretive titles that characterized expressive qualities and/or other nonliteral aspects of depicted content (e.g., "Escape," and "The Heritage of Motherhood").

Identical photographs and titles were used in this study to measure the effect of contextual information on junior high school students' categorization of differences among photographs that display low to high levels of abstraction.

Method

Design and Subjects

Three within-subjects variables were factorially combined in the experiment: Title Context (Correct Title, Erroneous Title, No Title), Abstraction Level (Low, Medium, High), and Title Type (Descriptive, Interpretive). Junior high school students enrolled in the Summer Arts Institute for the Gifted and Talented at Indiana University volunteered to participate in the study. The 12 students who completed the experiment were enrolled in a photography course at the Institute but had limited prior experience in photographic education. Testing was conducted during the second week of instruction after students were introduced to Barrett's category system.

Materials

Twelve photographs displaying varying abstraction levels and representing American photography from 1899 to 1972 were reproduced on 8 x 10 inch photographic paper. Photographs were selected with original artist generated descriptive and interpretive titles. Three photographic judges independently rated 24 photographs on the extent to which they displayed low to high levels of abstraction. Twelve photographs from the 24 judged were selected for use in the experiment, six with descriptive titles and six with interpretive titles. Erroneous titles with misleading references to descriptive and interpretive aspects of the photographs were also generated and unanimously agreed upon by the judges.

Text booklets included three copies of each photograph, one with the original correct title, one with the erroneous title, and one with no title. Presentation order of the 36 photographs were randomized independently for each set of test booklets. Multi-colored question cards were used by subjects to record their responses to test questions. Each card was prepared with a list of answer alternatives and the title of the corresponding photographs.

Dependent Measure

The test included oral and written instructions informing participants that they were to consider each photograph in relation to its title and determine its correspondence with the following categories: (1) descriptive, (2) explanatory, (3) interpretive, (4) ethically evaluative, (5) aesthetically evaluative, and (6) theoretical. Since the category system was designed as an overlapping structure for considering the differences among photographs, subjects were instructed to rank order the three categories that best matched each photograph in relation to its title.

Procedure

Subjects were introduced to the differences among photographs as outlined by Barrett (1980) in an hour long slide-lecture presentation the evening before the experiment. The participants were also engaged in a discussion of how selected slides of photographs matched Barrett's categories immediately following the lecture in order to assess students' comprehension of the presentation. Subjects were again asked to demonstrate their understanding of these concepts in a review session the next morning just prior to the experiment.

Testing began with instruction in the use of the test booklets and the question cards. Subjects were given as much time as they wished to study each photograph in relation to its title and to give their categorization responses. Upon completion of the test, subjects were instructed to translate each of the six categories into their own words thereby indicating their understanding of the categorical differences used in ranking the photographs.

Results and Discussion

Category Errors

Categorizations of the correctly titled, erroneously titled, and nontitled photographs were first analyzed by comparing the junior high school students' rankings to those independently made by four art judges with advanced degrees in the visual arts who had prior knowledge of Barrett's category system. Table 1 lists the judges' category assignments for every photograph categorized by subjects. Unlike the participants of the experiment, judges had the benefit of knowing the correct title of each photograph when making their categorizations.

The category error scoring procedure involved the subtraction of five points for every categorization made by subjects that did not match any one of the three given each photograph by the art judges. These error scores were then totaled by title context, by abstraction level, and by title type acorss all repeated measures. An analysis of variance on category errors indicated statistically significant differences for the following main effects and interactions: Abstraction Level, Title Type, Abstraction Level x Title Type, and Abstraction Level x Title Type x Title Context (see Table 2).

As expected, post hoc comparisons indicated the categorization of highly abstract photographs were most inaccurate, i.e., high abstraction ($\underline{M}$ = 8.54)>medium abstraction ($\underline{M}$ = 5.63) = low abstraction ($\underline{M}$ = 6.81), $\underline{p} < .01$. Subjects apparently found descriptive titles ($\underline{M}$ = 7.50) and interpretive titles ($\underline{M}$ = 6.11) equally beneficial when ranking photographs low in abstraction, yet significant differences were found in error performance when interpretive titles accompanied photographs displaying medium abstraction [interpretive ($\underline{M}$ = 8.33) > descriptive ($\underline{M}$ = 2.92), $\underline{p} < .01$] and high abstraction levels [interpretive ($\underline{M}$ = 13.19) > descriptive ($\underline{M}$ = 3.88), $\underline{p} < .01$].

Table 1
Categorical Rankings of Photographs by Judges

Abstraction Level		Categorical Rankings: First Choice	Second Choice	Third Choice
Low Abstraction				
Descriptive title	(1)	4 4 4 4	3 3 3 3	2 2 U U
	(2)	2 2 2 4	1 2 4 5	1 1 3 5
Interpretive title	(3)	4 4 4 4	2 2 2 2	1 3 3 3
	(4)	3 3 4 4	3 4 4 5	2 3 5 U
Medium Abstraction				
Descriptive title	(5)	3 4 6 6	1 3 5 5	1 1 5 6
	(6)	2 2 2 5	2 4 4 5	1 1 3 [illegible]
Interpretive title	(7)	3 3 3 5	3 5 5 5	4 6 U U
	(8)	3 3 3 4	3 4 5 5	2 2 5 U
High Abstraction				
Descriptive title	(9)	1 5 5 5	1 2 3 5	1 6 U U
	(10)	1 1 1 1	2 5 5 5	2 2 2 5
Interpretive title	(11)	3 3 5 5	3 3 5 6	5 6 U U
	(12)	3 3 3 5	3 5 5 6	5 U U U

Note. Categorical rankings for 12 photographs are given for judges one through four with U indicating an undecided choice. Categories were assigned numbered labels as follows:

1. Descriptive photographs
2. Explanatory photographs
3. Interpretive photographs
4. Ethically evaluative photographs
5. Aesthetically evaluative photographs
6. Theoretical photographs

Table 2
Analysis of Variance Summary Table: Category Errors

Source	df	SS	MS	F	P
Abstraction Level	2	309.9[illegible]	154.98	14.11	.001
Title Type	1	1066.83	1066.83	97.16	.001
Title Context	2	3.01	1.51	.14	NS
Abstraction Level X Title Type	2	1063.70	531.85	48.44	.001
Abstraction Level X Title Context	4	76.85	19.21	1.75	NS
Title Type X Title Context	2	14.42	7.21	.66	NS
Abstraction Level X Title Type X Title Context	4	889.05	222.26	20.24	.001
Pooled Error	187	2052.86	10.98		

Table 3
Analysis of Variance Summary Table: Categorical Rankings

Source	df	SS	MS	F	P
Abstraction Level	2	11.59	5.80	1.74	NS
Title Type	1	19.56	19.56	5.89	.05
Title Context	2	9.17	4.59	1.38	NS
Abstraction Level X Title Type	2	9.60	4.80	1.44	NS
Abstraction Level X Title Context	4	41.31	10.33	3.11	.05
Title Type X Title Context	2	4.74	2.37	.71	NS
Abstraction Level X Title Type X Title Context	4	11.05	2.76	.83	NS
Pooled Error	187	621.48	3.32		

Further analysis of the Abstraction Level x Title Type x Title Context interaction indicated interpretive titles contributed to the largest number of category errors for highly abstract photographs in the correct title condition [interpretive ($\underline{M}$ = 12.50) > descriptive ($\underline{M}$ = 4.58), $\underline{p} < .01$]. Post hoc comparison of interpretive title context errors showed: erroneous titles ($\underline{M}$ = 9.16) = correct titles ($\underline{M}$ = 7.50) > no titles ($\underline{M}$ =3.33), $\underline{p} < .01$, for medium abstraction photographs, and similarly that erroneous titles ($\underline{M}$ = 13.75) = correct titles ($\underline{M}$ = 12.50) > no titles ($\underline{M}$ = 4.16), $\underline{p} < .01$, for highly abstract photographs. No significant differences were found for title contexts when low abstraction photographs were ranked. Viewers evidently had difficulty discerning the reliability of titles when they referenced nonliteral dimensions of ambiguous images. Subjects used correct descriptive information to their advantage but failed in detecting the inaccuracy of erroneous contextual information in the false titles.

Category Rankings

Subjects' rank orderings were also analyzed in relation to the category that best represented each photograph as ranked by the four art judges. An analysis of variance on these ranking scores showed significant differences for Title Type and for Abstraction Level x Title Context (see Table 3). Title type effects were found to match those in the prior analysis of category errors, i.e., descriptive titles ($\underline{M}$ = 3.25) guided subjects in making category assignments that matched the judges' rankings with significantly greater frequency than interpretive titles ($\underline{M}$ = 2.65). Findings deviated from error performance for low and medium abstraction photographs in which case no significant differences were observed for title context. Correct titles ($\underline{M}$ = 2.96) and erroneous titles ($\underline{M}$ = 2.29) did, however, match previous findings in misleading subjects' categorization of highly abstract photographs, $\underline{p} < .01$. The presence of titles' contextual information apparently confused viewers when they failed to distinguish erroneous information from correct reference cues. This ambiguity was overcome when title contexts were absent for high abstraction photographs in the no title condition ($\underline{M}$ = 3.96). Subjects, nevertheless, had greatest difficulty categorizing the differences among untitled photographs when they displayed high levels of abstraction, i.e., low abstraction ($\underline{M}$ = 2.63) = medium abstraction ($\underline{M}$ = 2.88) high abstraction ($\underline{M}$ = 3.96), $\underline{p} < .05$. These abstraction level effects were not matched in either the correct title nor erroneous title contexts.

Conclusions

Results indicated viewers were indeed influenced by the nature of contextual information that accompanied photographs of varying levels of abstraction throughout presentation. Such findings support those observed by Koroscik, Desmond, and Brandon (in press) and suggest interpretive processing of photographs was enriched by the availability of informational cues that provided an interpretive framework. The concreteness of such cues were found to influence their usefulness. Subsequent research might examine these effects further by manipulating the amount of contextual information beyond merely the presentation of photographs with and without titles. Future investigations might

additionally study the differences in viewing responses for persons with varied levels of training in photography and the visual arts. Such research might outline important agenda for curricula designed with the goal of promoting the appreciation of photographic art.

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Perspective Drawing as Problem-Solving

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The purpose of this study was to develop a framework for the study of perspective drawing, specifically, a problem-solving framework. By examining think-aloud protocols and stragegies used by individuals engaged in perspective drawing tasks, we were able to localize some of the constraints that may serve to make perspective drawing a particularly difficult task for the untrained.

The problem of producing an accurate perspective drawing is analogous to a problem of "arrangement" (see Greeno, 1978). In perspective drawing the line elements of a geometric figure can be arranged in various relations to each other both in terms of their proportional lengths and their angular disparity. The required arrangement of lines is only known to be correct once it is achieved and the drawer can match it to the object he or she is looking at. The problem is special, for unlike problem-solving tasks normally studied (Greeno, 1978; Simon, 1978) some of the major constraints appear to be perceptual. The drawer must derive 2-dimensional information from a 3-dimensional context. This 2-dimensional information may contradict what the drawer 'knows' about the object, (e.g., that a square has equal sides). Hence, conceptual constraints are also in operation.

In addition to the constraints above, drawing requires production and therefore some type of strategy or plan. Whereas the figure may be apprehended as a unit, the reconstruction in drawing requires the coordination of its parts in terms of a sequence of activities. Hence, the problem consists of a series of subtasks that serve to constrain the possibilities for the final solution. Problems that arise in this respect are referred to here as the result of procedural constraints.

Method

The model used in the standard drawing task was a 30.5 cm. square styrofoam plane mounted on a stand allowing a vertical rotation. The model was placed 60 cm. from the participant and oriented 45 degrees counterclockwise centered to his or her line of sight. The participant's viewpoint in the standard task is presented in Figure 1. Participants were asked to draw the model as it looked from their position. They were tested individually. Participants were encouraged to adopt a problem-solving approach by trying to 'generate and test' a number of solutions. They were asked to think-aloud as they performed the task. If individuals had particular difficulty, if they continued to draw the same erroneous figure, for example, cues were provided suggesting aspects of the problem they should be aware of such as suggesting the kinds of changes that could be made, changes in line lengths and size of angles.

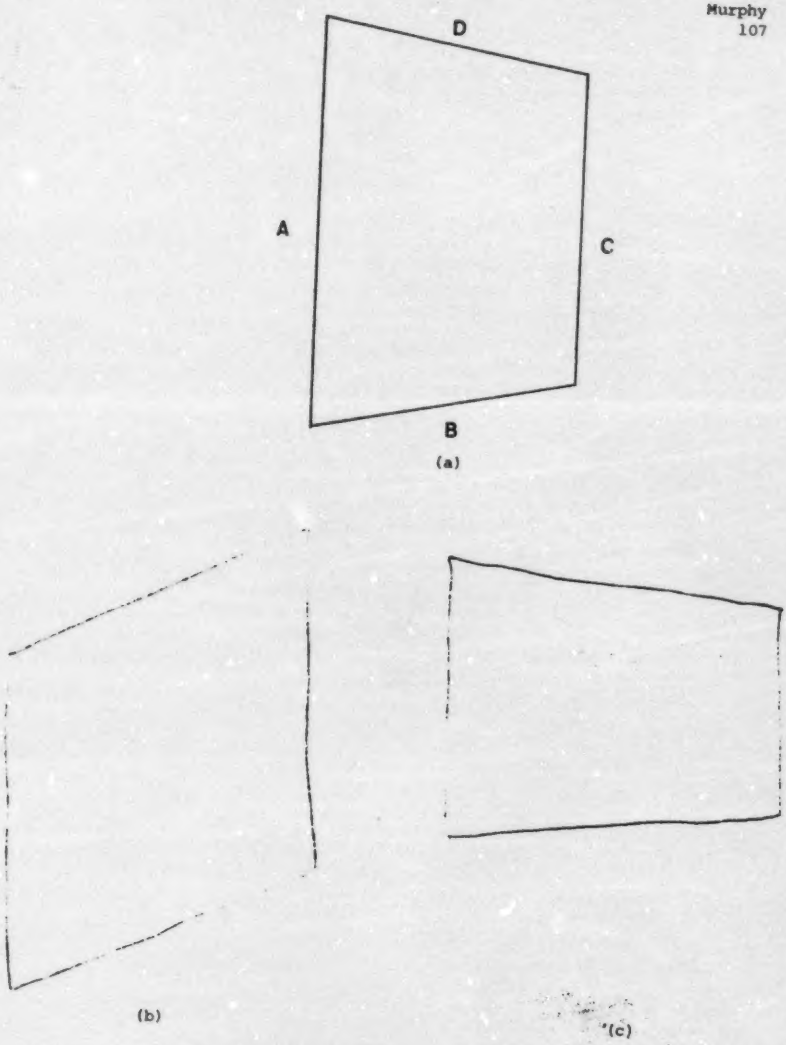

Figure 1. Perspective drawings of a square: (a) correct drawing; (b) sample drawing produced in oblique projections; and (c) sample drawing with extension.

The description of individuals' performance is based on a sample of 30 subjects whose ages ranged between 15 and 50 (mean age 29). All subjects were volunteers recruited by the experimenter, about 35% were university students.

Results and Discussion

The drawing and protocols described here sample data collected over the past two years. We believe that they are representative and that they demonstrate the types of conflicts individuals experience in performing the drawing tasks as well as the inferences they make about the relations between real and apparent shape.

Two consistent biases have been found in this study as well as in a previous one (Murphy and Bracewell, 1983). First, individuals have difficulty determining the inclination of the top edge D, consistently drawing this line up from A and parallel to B (see Figure 1). The result is a parallelogram (oblique projection). Secondly, some individuals lengthened the horizontal dimension as opposed to shortening it (foreshortening), a bias we refer to as extension. In the previous study with children between the ages of 5 and 12, these biases were less prevalent (Murphy and Bracewell, 1983). The use of extension increased with age. The parallelogram bias showed no age effects but accounted for over 25% of all the 250 drawings produced. In these more recent studies, over 85% of participants produced a parallelogram. A much smaller proportion produced extension although less than 10% produced foreshortening. These biases may be explained by the constraints discussed previously; perceptual, conceptual, and procedural.

Perceptual Constraints

Effects of the perceptual component of the problem were evidenced in the protocols. Some participants directly stated that the top edge appeard to "shift," and although subjects did not always make explicit comments, inconsistencies were found within individuals' protocols concerning the inclination of the top edge. One subject produced the following protocol when asked to judge the relative position of vertices AD and DC, referred to as the yellow and red dot respectively. The protocol illustrates the possible perceptual shifting.

Exp: Is the red dot higher or lower than the yellow dot?
Sub: ...my immediate reaction would be to say higher... but then I looked, and I thought, well, it kind of looks like it's on the same plane.... If I really concentrated I could make it even look lower... hmm...depends which dot I look at.... When I look at the red dot it looks lower than the yellow dot .... When I look at the yellow dot it looks lower than the red dot....

Exp: Try to keep your eyes focused when you make your judgment.
Sub: .....lower.....

Exp: Red is lower than yellow?
Sub: Yes....

Note that when the subject sees the vertices as on the same plane she sees the DC vertex as lower which is as it would be in perspective. In another session when the subject was asked to make the same judgment, the shifting was again indicated.

Perceptual effects were also indicated in the production of extension. Subjects frequently indicated that the horizontal dimension "looked longer." Perceptual biases were noted by one expert drawer who was also tested, who claimed he had to force himself to see it as he know it should be in perspective.

"Seeing in perspective" (Gibson, 1979) denotes the ability to become aware of the edges and boundaries of surfaces by mentally projecting them onto a certical plane of projection. It is the inability to see the figure in two dimensions that creates a major difficulty in drawing perspective. Overcoming this inability was aided by systematic intervention in this study. Three interventions were used to facilitate seeing the plane in 2-dimensions:

(1) Colored dots were placed at the vertices and participants were asked to make judgments as to their relative position, for example: Which vertex is lower, AD or DC? This proved to facilitate an accurate representation of the figure.
(2) A transparency was provided for drawing. Drawers would then hold the transparency in the vertical plane to check the fit of their drawing. This intervention proved extremely efficacious in allowing the drawers to see how their figure deviated from the model. Once the correct schema was established the drawer could make the proper measurements and adjustments.
(3) A new method was recently used with very interesting results. A model was constructed with a high gloss surface in a primary color, yellow or green on a side. Participants were instructed to focus on the figure for about 60 seconds, which is usually sufficient time to get an after-image, and then to draw the figure. Initially, we had participants trace the after-image, but it seemed that the ocular activity destroyed the image. Although even tracing led to better proportional reconstructions, they were not always accurate in terms of linear convergence. So we instructed drawers to focus on and analyze their after-image before they drew. The results suggested that the majority of participants were thus able to construct highly accurate representations. Indeed, some participants showed surprise at the configuration of their after-image.

Conceptual Constraints

The second major constraint we term "conceptual" in that it refers to the drawers' knowledge of the object's geometrical properties as well as their knowledge of the transformations in space that may or may not be used in the course of drawing. The protocols indicate that the operation of biases was in part the result of 'rationalizations'

made by the drawer. In other words, extension may be produced by literally translating abstract relations between subject and object onto the paper. Similarly, rationalizations may account for the production of figures in oblique projection. It appeared that rationalizations were still in large part a consequence of perceptual constraints in that the individual would attempt to get closure on perceptual ambiguities.

Procedural Constraints

Procedural constraints arise from the drawer's need to monitor production. In contrast to adults where the major constraint is perceptual; in children's drawing it is procedural (Murphy and Bracewell, 1983). Children have an undeveloped understanding of a euclidean coordinate system and have trouble coordinating the drawing sequence with respect to a point of reference. However, procedural concerns were evidenced in these data as well. Although knowledge of a euclidean coordinate reference system should facilitate both analyzing the object and organizing the drawing task (Murphy and Bracewell, 1983), adults may fail to use it systematically. It would appear that procedural concerns are in part a consequence of the individuals's inexperience with the task and may easily be remedied by appropriate instruction.

A Final Problem

One of the critical points to be made about this study is how individuals approached the task. It was generally the case that they insisted, "I can't draw." This was less indicative of the fact that they did not have the capacity to draw than that they did not know how to organize the skills and knowledge they did have to perform the task. One aim of our experimental procedure is to encourage individuals to gain control over the drawing task. It clearly works, for participants who went on to other drawing tasks were much quicker in generating drawings and achieving the solution. The procedure, especially the use of a transparency, enabled individuals to discover what it was that they must think about in solving the task.

Conclusion

The current account provides a framework for conducting research in drawing. It shows the area to be a rich domain of inquiry. It is interesting to note the discrepancy between our implicit knowledge of spatial transformations and the knowledge we can access to perform the task. It is often the case that individuals may solve the task yet be unaware of the continuous nature of spatial transformations. We believe such knowledge to be extremely useful in that our ability to grasp and solve complex physical problems may likely require the ability to manipulate spatial images. Finally, the results strongly indicate that individuals have many of the requisite skills for drawing, they simply need to be mobilized.

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Strategies of Representation: Observational Drawings of Four and Five Year Old Children

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Young children are often very serious about their drawings. Previous research has yielded much information on how children progress in their drawing of humans, houses, and other common objects. Arnheim (1954) defined developmental progress in drawing as an increasing ability to depict the structural characteristics of three dimensional objects within a two-dimensional surface. As children advance in age and in drawing abilities, their drawings depict spatial relationship with increased sophistication and clarity.

Developmental assessments of drawing stages tend to generalize the abilities of children, as they are based on averages and norms of various age levels and do not reflect individual aspects of children's drawing abilities. The purpose of this study was to describe the drawing capacities specific to four and five year old children. The task of representing a three-dimensional model through drawing was used rather than drawings portraying humans, animals, or houses because the model was a stimulus with which the subjects had no prior training or experience. Use of a model avoided evoking stereotypical symbols so often used by young children to represent persons, animals, and houses.

Golomb (1974) has addressed the issue of young children copying from nature as an educational practice:

> The ambition to copy nature is historically and developmentally a late phenomenon. Unlike the toddler of the sensory motor period, who closely observes the model in order to imitate its actions, the three-or four-year-old neither studies the model in an attempt to imitate it nor tries to copy an internal model as suggested by Eng (1931) and Piaget (1951). The three- to five-year-old youngster has neither the ambition, interest, or technical means for dealing with perspective distortions, undoing as it were the perceptual constancies of size and shape. (pp. 183-184)

There has been little educational precedent for asking children as young as four and five years of age to draw an object by copying from nature although several researchers have studied children's responses to this problem. Lewis and Lioson (1967) studied children's representations of three-dimensional objects within a two-dimensional medium. They found that young children typically represented a cube in an observational drawing by depicting only one side of the figure, whereas older children generally drew several sides. In a replication of this study Lewis, (1983) found that "few kindergarten children attached two or more sides of the squares" (p. 7). Lewis also found that a cube with patterns on each face elicited higher level solutions from young children than did a plain cube. She suggested that the cube with

patterned surfaces challenged and moved young children's drawings forward, while incorporating patterns in perspective drawing was too difficult for older children and caused their drawings to regress.

Other researchers using subjects as young as four and five years of age have shown that they were able to draw an unfamiliar object freely and easily (Willats & Hurn, 1978; Colbert, 1984). Willats and Hurn (1978) suggested that although young children may use stereotypes in their drawings, they do not have to depend on using them. Fucigna, Smith, and Goldsmith (1984) have shown that young children can also draw a familiar object from observation. From these studies, it appears that young children are capable of drawing from nature as well as drawing remembered experiences.

Representing an object through copying from nature involves the construction of correspondence between the attributes of the object drawn and the symbols used in the drawing. Shapiro (1979) has discussed the skills required in copying from nature:

> The development of a system of representation or a system for copying a three dimensional model and transforming it into a two dimensional drawing requires coordination of hand and eye movements, monitoring of hand movements, and cognitive strategies that determine the content, sequence, and style of the preformatory acts. (p. 58)

Copying from nature requires children to make multiple transformations. Children must perceptually differentiate the component parts of the model and maintain an awareness of their relationship as well as reconstructing them using their drawing abilities. Children who are copying a three-dimensional model are not just transcribing their perceptions into a two-dimensional representation, they are also learning to represent objects and ideas through symbols that come into play in this translation (Shapiro, 1979).

Method

Subjects

The 70 subjects participating in this study ranged from 4:2 to 5:6 years and were students in early childhood learning centers in the Southeast and Midwest. Subjects represented three racial groups: 5% were Oriental, 34% were Black, and 61% were Caucasian.

Apparatus

The model used as the drawing stimulus in this study was a 3 inch (8cm) balsa wood cube with a triangular solid top attached to the face and solid rectangular projections that were connected at the edges of the cube's faces, often covering surfaces on two faces. The model was painted white and decorated with strong black and white patterns including alternating black and white stripes, dots, bold black lines, checks, and a diamond.

Procedure

Subjects were tested individually in a private, controlled situation within the school. Subjects' drawings were completed on 8 1/2 x 11 inch (22 x 28cm) white drawing paper with small, fiber-tipped, black markers.

Subjects held the model in their hands and turned it from face to face to examine textures and patterns. Subjects then matched an asterisk on the bottom of the model with one drawn onto an outline of the bottom of the model and located on a piece of acetate which was adhered to the testing table. Placing the model on the acetate with asterisks matching gave each subject the same point of view for making the observational drawing.

Scoring

The drawings were sorted into groups based on the strategies used and outcomes of the representations. The classifications of drawings into groups was based on a consensus of three judges. Each of the 70 subjects' drawings was used and seven categories were established by the judges.

Results

The results of this study suggest that young children between the ages of four and five years possess a wide range of abilities allowing them to produce drawings made from observation. The four and five year old children participating in this study performed in one of seven categories which follow:

1. Drawings consisted of details and patterns from the model. These were not organized onto a representation of the model, as no outline of the model or a single face of the model was used.

2. Enclosed space was drawn to represent a single face of the model. Patterns and other details were drawn separately or not at all. Patterns were not attached to the model face.

3. A single face of the model was represented by an enclosed shape approximating a square. Details or patterns were drawn onto the square.

4. Multiple faces of the model were drawn but remained unattached. Two to six faces were drawn.

5. Triangular solid drawn attached to single face of the model.

6. At least two faces of the model drawn with sides attached. Faces include square faces of the cube and frontal and side faces of the traingular solid.

7. Drawings indicated depth through obliqueness or occlusion.

The ages of subjects were not compared with the outcomes of the drawing task because of the small age range and because subjects were grouped in classes according to abilities, not age. In each of the seven categories derived by the judges, there were drawings by children who were four and five years of age. The number of subjects and percentages of the sample whose drawings were in each of the seven categories can be seen in Table 1.

Table 1
Categories of Four and Five Year Old
Children's Drawings from Observation

Categories	No. Subjects	Percentage
1. Details only	6	8%
2. Enclosed shape - details separate	9	12%
3. Enclosed shape with details	8	11%
4. Multiple faces - unattached	9	12%
5. Triangular solid - attached to single face	17	24%
6. Two or more faces - sides attached	12	17%
7. Depth indicated through obliqueness or occlusion	9	12%

N = 70

Discussion

The subjects participating in this study produced drawings that outstripped their predicted capabilities. When findings of this study are considered in relation to the most comparable recent study (Lewis, 1983), the subjects of this study produced surprisingly sophisticated representations of a three-dimensional model. Only a few kindergarten-aged subjects in Lewis' study attached two or more sides in their drawings of a three-dimensional object.

One reason for such differences in results from the two studies may be in the type of objects subjects were asked to draw. In Lewis' study, children drew photographic cubes with and without patterns. The patterned cube consisted of six faces with inserted patterns drawn in black on white cardboard. The patterns used included a 1 1/2 inch circle, six horizontal lines, six vertical lines, a grid of interesting lines, and two with plain faces. The model used in this study consisted of a basic cube with projections and bold black and white patterns. Subjects' interest in the projections and patterns were reflected in

their inclusion of these elements in their drawings. Perhaps the projections and bold patterns made the model used in this study more challenging or more interesting to draw than the plastic photographic cube with patterned inserts.

There were also differences in the procedures used by Lewis and those used in this study. Lewis tested groups of subjects in intact classes to simultaneously draw the cube at his or her desk. Subjects were permitted to look at the cube, but not to move it. These restraints were used to maintain a fixed point of view for all subjects, yet they restricted subjects from having a multi-sensory experience and an intimate examination of the model. Subjects in the present study made their drawings individually which gave them the opportunity to work at their own pace without making comparisons on amount of time spent or outcomes of other subjects' drawings. Also, in this study subjects were required to handle and examine the model prior to drawing it. The model was designed with tactile elements as well as with bold patterns on all six faces to set up conflicts for subjects when they drew it viewing only three faces.

Conclusions

The results of this study suggest that children of four and five years of age possess a wide range of capabilities and strategies for making drawings of a three-dimensional model from observation. The results also suggest that in such tasks, the object or objects to be drawn should be chosen to challenge children's abilities and to make them strive for solutions to the problem not generally used in more stereotypical drawing. Young children's abilities to draw from observation appear to be much greater than most texts and early research indicate.

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1984 Arts and Learning Special Interest Group Program

April 23-27
New Orleans, Louisiana

12.12 The Arts: Contexts and Learning, Part 1 (10:35-12:05; April 24)

Chair: Hermine Feinstein, University of Cincinnati

Participants: First Graders' Classroom Conversations About Art Making: Social Life, Fantasy, Play, Verisimilitude, and Procedures. Robin Alexander, Eanes School (TX)

Film and Interest: An Analysis of Elementary School Children's Preferences for the Liveliest Art. Carole Cox, Louisiana State University

Children's Representations of Time in Music. Carolyn Hildebrandt, University of California at Berkeley

**The Effect of Movement on Attitudes of Fifth Grade Students Toward their Music Class. Deborah Carlson, University of Tennessee

16.12 The Arts: Contexts and Learning, Part 2 (2:15-3:45; April 24)

Chair: Hermine Feinstein, University of Cincinnati

Participants: The Effects of Verbal Contextual Information on Visual Art Processing. Judith Koroscik, The Ohio State University

What is Said and What is Depicted: The Role of Medium, Referent, Age, and Knowledge in Representation. Stuart Reifel, University of Texas at Austin

Photographs, Contexts, and Interpretations. Terry Barrett, The Ohio State University

**The Development of Children's Ability to Render Shape and Form. Carolee Fucigna, Tufts University; Nancy R. Smith, University of Oregon; Lynn Goldsmith, Massachusetts Institute of Technology

Developing an Instrument to Measure Dramatic Behavior. Helane Rosenberg, Patricia Pinciotti, & Jeffrey K. Smith, Rutgers University

12.05 Round Table Session (8:45-9:25; April 25)

Participants: Differences Among Ability Groups in Participation in the Performing Arts at the High School Level. Patricia Dwinell & Mark Hogrehe, University of Georgia

The Application of Questioning Strategy Research to Art Criticism Instruction. Karen Hamblen, California State University at Long Beach

**A Comparison of the Attitudes of Fourth, Fifth, and Sixth Grade Students to the Arts. Crystal Tilton, Rio Linda Union (CA) School District

48.04 Teaching Art vs. Teaching About Art (6:15-7:45; April 26)

Chair: Nancy MacGregor, The Ohio State University

Participants Representing the J. Paul Getty Institute:

The Getty Institute as Research and Development. W. Dwaine Greer, The University of Arizona

The Getty Institute as a Vehicle for Inservice Education. Hermine Feinstein, University of Cincinnati

The Getty Institute Evaluation and Follow Through. Jean Rush, The University of Arizona

Participants Representing The Philadelphia Museum of Art Institute:

The Philadelphia Museum of Art Institute as Research and Development. Theodore Katz, The Philadelphia Museum of Art

The Philadelphia Museum of Art Institute as a Vehicle for Inservice Education. Jessie Lovano-Kerr, Florida State University

**The Philadelphia Museum of Art Institute Evaluation and Follow Through. Calvin Nodine, Temple University

52.32 Round Table Session (10:35-11:15; April 27)

Participants: A Study of Infant Musical Productivity. Linda Kelley & Brian Sutton-Smith, University of Pennsylvania

Contextual Information Effects on the Categorization of Differences Among Photographs. Kathleen Desmond, The Ohio State University at Newark & Judith Koroscik, The Ohio State University

54.32 Round Table Session (12:25-1:05; April 27)

Participants: Strategies of Representation: Observational Drawings of Four-and Five-Year Old Children. Cynthia Colbert, University of South Carolina

Perspective Drawing as Problem Solving. J. Anne Murphy, Ontario Institute for Studies in Education

**Papers not available for publication.